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NON-PERFORATING ULCERS OF THE STOMACH AND DUODENUM

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THIS paper, as its title implies, is devoted to a discussion of the non-perforating ulcers which I operated upon in my service last year. The number, thirty-eight, is not large. Perhaps it seems strange that in a large hospital where over 4000 operations are done annually, such a small number of ulcers came under my care. This is explained by the fact that my term of service is but nine months in duration, confined to the college year, and is essentially a teaching service. Therefore, this series does not include the private cases of my colleagues, nor the house cases operated upon in other services.

Recently, I presented a paper which was a resume of all of my cases of surgery of the stomach, numbering approximately 150. From that series, certain deductions were made:—

1. That by exercising greater care in the pre-operative study of our cases, we might recognize and eliminate some of the extraneous diseases which seriously jeopardize operative results.
2. That the selection of the right type of operation was of imperative importance.
3. That the operative technique might be further improved.
4. That we must be alert to detect post-operative complications which call for immediate surgical interference.

We have, therefore, in this later series, made every effort to give our cases very careful pre-operative study. This comprised in addition to the routine pre-operative investigations, all the help we could obtain from our very efficient X Ray department, from our laboratories and especial attention to the cleansing of teeth and mouth for several days prior to operation. Careful study of concomitant diseases not related closely to the stomach allowed us to anticipate trouble from these sources and bend every effort to prevent serious complications and avert calamity.

We operated upon thirty-eight cases with non-perforating ulcers; of these, twelve were gastric and twenty-six, duodenal. We lost one case only, a mortality of 2.6%.

The record of the fatal case follows: Mr. M.,

age 37, entered the hospital with a history of ulcer extending over seven years, epigastric pain, repeated hemorrhages, anorexia, nausea and vomiting, extreme emaciation, Haemoglobin 65%. The X Rays showed a 30% residue, an ulcer of the pylorus with adhesions, a contracted pylorus and a tremendously dilated stomach. We performed a gastro-enterostomy; all X Ray findings were corroborated but our patient died from starvation.

A better method of treatment would have been a jejunostomy under local analgesia and jejunal feeding until he was in condition to withstand the more severe operation. The autopsy showed no peritonitis, nor technical error in operative procedure.

Briefly, we will consider certain data compiled from these 38 cases. 25 were males and 13 were females. The average age was 37, the youngest 18 and the oldest 66. The average duration of symptoms was seven years, the longest 25 years. Nine were less than one year in duration. The concomitant diseases were:

Cholecystitis	2
Appendicitis	9
Tubercular peritonitis	2
Defective and diseased teeth	17

The symptoms elicited were as follows:

Pain, epigastric	36
Pain, epigastric, relieved by food	8
Pain, epigastric, caused by food	4
Loss of weight (5 to 50 lbs.)	26
Vomiting	23
Pyrosis	20
Hemorrhage	13
Massive hemorrhage	6
Anorexia	6

More and more do we place reliance upon the history as perhaps the most important factor in diagnosis:—In chronic ulcer, the history of previous attacks, of severe and protracted indigestion, the hyperchlorhydria, pain, vomiting, hematemesis and melena. The hyperchlorhydria gives rise to pyrosis, the burning eructations, the

waterbrash and the vomiting; the erosion of blood vessels to the vomiting of blood and melena, the degree of bleeding being dependent upon the site of the lesion and its contact with blood vessels which are penetrated.

The amount of blood lost may vary from the slightest capillary oozing detectable only by chemical tests, to the alarming or fatal hemorrhage. The remissions and exacerbations of symptoms are characteristic and the acuteness of the gastric symptoms leads the patients to self-imposed starvation resulting in great loss of weight and strength.

The relation of pain to the taking of food is by no means reliable in the differentiation of gastric from duodenal ulcer. When we consider that the duodenal ulcer lies just beyond the pylorus and the gastric ulcer oftentimes just proximal to it, a variation of less than half an inch in these positions will not make any essential difference in the clinical manifestations. Therefore, the sequence of food, pain and relief, characteristic of the ulcer of the lesser curvature and fundus of the stomach, does not apply to the ulcer of the stomach in juxtaposition to the pylorus which may simulate the duodenal ulcer, with the sequence of food, relief, and pain.

After a careful study of the history of symptoms, we turn to the laboratory for further assistance. First to the X Ray department. Not too much should be expected from this department in the diagnosis of the small, non-indurating and acute ulcer of the stomach and duodenum. Structural changes must be present and gross deviation from the normal, before the X Ray can detect the pathology. In other words, these structural defects must exist before they can be seen. In the acute ulcer, they may not be present. The ulcer at this stage is an abrasion of the mucous membrane only, difficult or impossible to detect with the abdomen open and by the most careful palpation. Why expect the X Ray to reveal what we can scarcely discern by combined ocular inspection and palpation.

The X Ray may give demonstration of the hour-glass contraction, the chronic indurating ulcer, with crater or filling defect, its location, the deformity of the duodenal cap, the fixation of the stomach to surrounding viscera; its size, shape and outline, its emptying time, and make positive the diagnosis of a suspected ulcer in many cases otherwise impossible of demonstration. On the other hand, it may fail to show any evidence of a lesion which at operation can be readily demonstrated. In my 38 cases the ulcer was correctly diagnosed by X Ray in 18 cases and in 12 cases where an ulcer was found, the X Ray had failed to show it.

Examination of the feces and of vomitus is made, in order to determine the presence of occult blood. The routine examination of stomach contents after a test meal, is no longer practiced

in my clinic because we doubt its efficiency. We find that after a careful history and study, this experience so unpleasant to the patient, may be eliminated.

Complete physical examination, blood pressure and urinary analyses of 24 hour specimen complete the pre-operative study, which usually requires three or four days.

During this time, the teeth are cleansed and antiseptic mouth washes are employed. As soon as the X Ray examinations are completed the bowels are thoroughly emptied of the barium. This will require laxol and one or more enemas and in spite of precautions, a large amount of barium is frequently found in the bowel at operations, where a considerable interval has elapsed since its administration.

The operations for ulcer are many and varied; gastro-jejunostomy with or without resection of ulcer, pyloroplasty, pylorotomy, partial gastrectomy, &c. and we are convinced that the selection of the operation best adapted to the case means relief from symptoms and lowering of mortality. Upon this series of cases we performed operations as follows:—

Gastro-enterostomy	13
Gastro-enterostomy with excision	10
Gastro-enterostomy with plication	5
Pylorotomy	2
Pylorotomy with gastro-enterostomy	3
Excision of ulcer	3
Jejunostomy	2

We have no reason to change our views regarding the desirability of posterior gastro-enterostomy, which is indicated in fully 85 percent of ulcers. This leaves 15 percent which may require the Finney operation, or may be treated by plication or excision without gastro-enterostomy. Included in these are the relatively rare acute perforations which are too seriously ill to admit of prolonged operation.

There is an opportunity for sound surgical judgment in the selection of the type and extent of operation desirable. When the stomach is not fixed to underlying structures and when the exigencies of the case permit, it is my custom to make a posterior gastro-jejunostomy after excision of the ulcer. Ulcers of small size were excised with the electro-cautery. Those of large dimensions were frequently excised with the knife. Ulcers located in the pyloric end of the stomach call for excision of the pylorus, including the ulcer. This is done by clamping, severing with the cautery and infolding. The proximal end of the duodenum is similarly treated, after which a posterior gastro-enterostomy is done. An ulcer on the posterior stomach wall with deep crater firmly fixed to the pancreas may best be left with its attachments undisturbed, in which case, its crater and indurated

rim may be cauterized through the gastro-enterostomy opening in the stomach wall.

Ulcers of small size near the pylorus, if upon the anterior wall, are treated by sinking the cautery blade into the crater of the ulcer and burning laterally until the ulcer with the indurated zone is destroyed. The defect is then closed with catgut sutures and finally with a Pagenstecher thread through the peritoneal coat, incorporating a part of the muscular coat of the stomach.

If ulcers are not excised they are very likely to give rise to further trouble, either by perpetuating gastric symptoms, by subsequent hemorrhage, or by malignant degeneration. Ulcers of the duodenum do not always require excision, yet if such ulcers lend themselves readily to excision with the cautery, we seldom fail to destroy them. We are told that they rarely become malignant, but in my experience they may bleed and a gastro-enterostomy does not preclude this possibility. Hence, when there is a duodenal ulcer with a history of hemorrhage, we should not fail to eradicate this ulcer. In two cases (not in this series) alarming subsequent hemorrhage has followed gastro-enterostomy without excision of the bleeding ulcer of the duodenum.

When there is no history of hemorrhage, small duodenal ulcers may be plicated as a protection from perforation, but their destruction with a cautery is a safe procedure and a radical cure.

In two cases of this series, jejunostomies were done. I am a firm believer in this measure. In both cases, we were face to face with starvation, where the loss of weight was tremendous, asthenia alarming, acid poisoning severe, with extreme dilatation of the stomach from obstruction. In such cases gastro-enterostomy can not be done with safety, but a catheter may be slipped into the jejunum through a small incision made under novocain. The patient may be fed through this catheter as long as it seems desirable and an amazing improvement in the patient's condition becomes apparent almost immediately, with a considerable gain in weight. Stomach lavage should be practiced occasionally and when sufficient improvement is manifest, radical operation may be done.

Case I. Miss K. Age 61, had suffered from gastric ulcer for eight years, with severe epigastric pain, vomiting, hematemesis, anaemia and emaciation. She was bedridden with myocarditis and very severe auricular fibrillation. She had a large ulcer of the lesser curvature and an hour-glass stomach. Her physical condition, as vouched for by the medical service, precluded any major operation, but permitted introduction of catheter into jejunum under local infiltration with novocain. She improved so remarkably under jejunal feeding and rest of her stomach, that she became practically free from symptoms,

permitting us to remove the tube, since which she has continued to improve, has gained 20 pounds, has been able to resume her work as a seamstress and, with attention to her diet, is free from digestive disturbance. She now has no intention of being operated upon, for she is enjoying better health, eight months after this operation, than at any time during a period of eight years. Her ulcer is not cured and it will undoubtedly bother her again, but she is relieved and could be operated upon today with relative safety.

Case II. Mrs. M. Age 45. Greatly emaciated, from starvation, great dilatation of stomach from pyloric obstruction due to ulcer, secondary anaemia from hemorrhage, pyrosis, epigastric pain and malena. Jejunostomy was followed by marked improvement and a gain of eight pounds, while the catheter remained in position. Patient felt so well that she requested its removal and against our judgment she signed a release and left the hospital. Her relief was so great that she refused operation. We were unable to follow this case after she left the hospital and therefore can not give her present condition.

Special attention must be given to the post-operative complications which are responsible for a large number of deaths, and which in my clinic would have proved fatal in four cases had not prompt secondary operations been done. The abdomen was re-entered and definite obstructive lesions found, which would have been fatal had operation been delayed.

The lesson from these cases and from other similar misfortunes is now indelibly stamped upon my mind. The convalescence from stomach operations should be uninterrupted and not accompanied by severe post-operative vomiting. When this occurs early, the cause is usually acute dilatation of the stomach. This condition is serious, causing intense suffering, places great strain upon the suture line in the stomach wall, but fortunately has never caused leakage in my experience.

The acutely dilated stomach calls loudly for the use of the stomach tube. If gastric lavage is done promptly, the suffering and the vomiting will cease. If delayed, frequent lavage will be demanded, for when once the stomach is greatly over-distended a condition of atony develops and peristalsis is decreased or entirely absent.

Hence, gastric contents puddle in the atonic viscus, leading to recurrence of symptoms, necessitating repeated gastric lavage. Patients suffering from starvation with loss of muscle force are prone to dilatation. A gastro-enterostomy admitting three fingers in the stoma will not suffice to empty the stomach. Peristalsis is what is required and the asthenia of the stomach will render efficient peristaltic movements impossible. The stomach tube is of prime importance

in the post-operative care of stomach cases. Its use is too often delayed or omitted to the great detriment of the patient. The bad results of an acute dilatation of the stomach are serious, persisting for months after operation, causing pain and eructations.

The first lesson, then, is the early use of the stomach is not relieved by it, there must be some stomach tube; the second that if dilatation of the definite reason for failure, such as a technical error in gastro-enterostomy, kinking of intestine, or obstruction from adhesions. Patients doing well do not persistently vomit. They will not be relieved without operative investigation and promptness in reopening these cases is urgently demanded. Two cases of acute intestinal obstruction at points remote from the site of operation, illustrate the urgency of secondary operation, as both would have resulted fatally had we delayed and both by prompt operative interference were saved.

Much attention is paid to the feeding of patients following gastro-enterostomy. We have worked out a rational dietary which has been followed rather rigidly throughout my service and we have seen no reason to alter it materially.

The following is our routine post-operative treatment of stomach cases:

Fowler position. Murphy drip, continuous for first 24 hours. Morph. sulph. gr. $\frac{1}{4}$ hypo. Nothing by mouth for 1st 6 hours, after which patient may have water, hot or cold, teaspoonful doses every 10 minutes, if not vomiting. If vomiting, withhold water and notify house officer.

At the end of 24 hours:

Milk or strained gruels, $\frac{1}{2}$ oz. hourly.

2nd day. Milk or strained gruels, 1 oz. hourly

3d day. 1 oz. hourly selected from the following: Milk, ice cream, strained gruels, malted milk, fruit juices.

4th day. 2 oz. every 2 hours selected from the following: Cream soups strained, Coffee, cocoa, ice cream, gruels, fruit juices, raw eggs, milk, malted milk, bouillon, butter-milk, jellies, whipped cream.

5th day. 4 oz. every 2 hours of the same.

6th day. 5 oz. every 2 hours of above articles, adding custard, milk toast, blanc mange, cereals not strained.

7th day. Soft boiled egg, dropped egg, cracker, tea, in addition to above articles. *Five small meals daily.*

10th day. Add to above articles, stewed fruits which have been sieved. Fruit souffles, baked apples without skin. Any breakfast food. Cream cheese, or small amount of any mild cheese. Macaroni, spaghetti. All soups except tomato. Small portions of everything. *Five small meals daily.*

At the end of 2 weeks:

Add to above articles, vegetables riced (not

cabbage or spinach). Bread, muffins, small amount of chicken, lamb, or codfish, baked or boiled and minced (not fried). Small portions of everything. Five small meals daily.

The arrangement of this diet table has proved very helpful. It does away with the perplexity of writing diet prescriptions for patients individually and if a patient fails to progress as rapidly as the average, and should he complain of gas, distress or vomiting, on, for instance, the 7th day, we may return to the diet of the 2nd or 4th day, awaiting improvement, when he may be promoted according to the judgment of the surgeon.

Another advantage of this routine is that nurses and the diet kitchen may know in advance about what will be required in sufficient time to make adequate provision.

When a patient is discharged, he is instructed in writing, as to what he shall eat. These patients are hungry from long restricted dietary made necessary by the chronic ulcer, and are free from digestive disturbances after operation, especially if an excision of ulcer has been done. They are so elated by the fact that they can eat without distress, that they are likely to indulge injudiciously and suffer in consequence.

Several years ago, I operated in the late summer upon a colored woman, excising an ulcer of the pylorus and making a gastro-enterostomy. At Thanksgiving, she indulged in a feast which would be criminal and abusive to the stomach of anyone but a growing boy. She related in detail what she had eaten and all this, without distress. She was making up for ten years of ulcer diet and had gained in three months about 30 pounds. Several months later, I saw her again, still rejoicing and eating and she had gained 15 more pounds. About a year after her operation, she passed away suddenly from pneumonia, but the last year of her life was the happiest. Not often will a patient tolerate such dissipation. If the best results are to be obtained, the diet should be carefully regulated.

We turn now to the most interesting chapter in stomach surgery: the "follow-up." The apostle says "What shall it profit a man if he gain the whole world, but lose his own soul." In surgical parlance this might well read: what profit does a patient derive from a brilliant operation, if thereby he loses his own life, or fails to benefit from the experience.

This hospital several years ago inaugurated "follow-up clinics." House patients discharged from the hospital receive notice that in three months they will be requested to appear for examination. At these visits they are seen by the surgeon who operated upon them. Here we have a chance to see the results of our own work. At this first visit, they may be requested

to come again at a date specified. The 37 patients have either presented themselves at this clinic, or means have been taken to ascertain the results. You will say that it is too soon to formulate any opinion as to the permanency of cure and this is true, but it is valuable nevertheless to know the present status of these cases and to get this information directly from the patient supplemented by our own observation. Thirty-four cases have been traced through our follow-up system; of these, 30 have been entirely relieved of all symptoms and four are improved. Three have not been heard from.

Let it be understood that we do not advocate surgery for the acute gastric ulcer. We prefer that these ulcers be cured medically. Most of our operations were upon chronic ulcers, which had been "cured" several times under medical treatment before they sought operative relief. But, we do urgently recommend surgery for the radical cure of chronic indurating ulcer of the stomach and duodenum. Here medical measures do not avail. Under the very restricted diet, approaching starvation, they may continue to exist, but they are not cured. They have periods of relief while under treatment, but the disease becomes aggravated upon any departure from the strict regime.

Inasmuch as medical treatment is no safer than surgery,¹ as it offers less promise of radical cure and little hope of lasting relief, requires strict and unpleasant dietary restrictions, subjects the patient to the hazard of stenosis and perforation, hemorrhage and cancer, wherein lies the justification for medical treatment in these chronic ulcers?

CONCLUSIONS

1. Carious and defective teeth are probably responsible for infections of the alimentary tract, gastric and duodenal ulcer, cholecystitis and appendicitis; hence the very frequent association of these diseases.

2. The most constant symptoms of ulcer are

in the order mentioned: epigastric pain, loss of weight, vomiting, pyrosis, hemorrhage.

3. History and X Ray are the most important factors in diagnosis.

4. Duodenal ulcers are twice as frequent as gastric ulcers.

5. Gastro-enterostomy with excision of ulcer is the ideal operation for gastric ulcer.

6. Destruction of the duodenal ulcer (with gastro-enterostomy) is desirable in order to assure a radical cure, and should always be done if bleeding has occurred.

7. Massive hemorrhage should be treated medically until hemorrhage ceases and patient recuperates sufficiently to permit of resection of ulcer.

8. Desperate cases of starvation from stenosis should be treated by preliminary jejunostomy.

9. Acute ulcer should be treated medically; chronic indurating ulcer, surgically.

10. Early post-operative vomiting signifies dilatation of the stomach, which should be treated by gastric lavage.

11. Protracted post-operative vomiting, not relieved by gastric lavage, demands prompt surgical interference and the most frequent cause is intestinal obstruction.

12. Intestinal adhesions from previous operations may seriously complicate an otherwise well-indicated gastro-enterostomy for gastric or duodenal ulcer.

13. No operations for ulcer should be made without inspection of gall bladder and appendix and, if diseased, these organs should be removed, if compatible with safety.

14. A systematic follow-up system is the only way to obtain accurate knowledge concerning end results.

The writer wishes to acknowledge his indebtedness to Dr. C. W. McClure for the reference of many cases and for valuable assistance in diagnosis and advice in the post-operative treatment.

INTUSSUSCEPTION IN ADULTS*

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INTUSSUSCEPTION is probably the most common form of obstruction in children and almost the only one met in infants. The ileo-cecal type represents about 52% of the cases in adults. The acute type is most frequent in children, while chronic intussusceptions, with partial permeability of the bowel, are more common in adults, and transition forms are occasionally met with. Chronic intussusception may be classified as (a) recurrent form with constantly repeated invagi-

nation of the same intestinal coil, and (b) chronic intussusception with incarceration. Chronic intussusception is much less common than the acute type, and recurs in older children as well as in adults, most frequently as ileo-cecal intussusception.

The predisposing factors of intussusception consist of increased peristalsis and a long mesentery poor in fat. The direct cause of intussusception in adults is often represented by pedunculated tumors, malignant growths, an inverted appendix or Meckel's diverticulum. A classifi-

*Read before the New Hampshire Medical Society, at Manchester, N. H., Wednesday, June 25, 1914.

eation of the responsible etiological factors, arranged in the order of their relative importance in the production of the disease, is as follows:—

(1) Tumors of the small intestine, benign or more rarely malignant, are a comparatively frequent cause of intussusception in adults. Those tumors which grow from the inner layers of the intestinal wall are attached to a constricted or pedunculated base, and project into the lumen, are more apt to induce intussusception than the subserous growths which protrude towards the peritoneal cavity. Polyps, sometimes multiple, and pedunculated lipomas are the most common varieties encountered. A Meckel's diverticulum is sometimes found associated with a benign intestinal tumor. Benign growths of the large intestine causing intussusception may be situated in the rectum or sigmoid flexure of the colon.

(2) Intestinal ulceration, in the form of simple inflammatory ulcers, or as a sequel of typhoid fever, dysentery, tuberculosis, etc., is a rather common cause of intussusception in adults.

(3) An inverted Meckel's diverticulum or appendix is sometimes found in connection with intussusception in adults, the mechanism of the lesion being probably referable to irritation or inflammation from obstructed drainage of the diverticular contents or to small tumors on the floor of the diverticulum. These cases of inverted and infected Meckel's diverticulum are apt to be especially dangerous.

(4) Foreign bodies in the digestive canal are an occasional causative or contributory factor in the onset of intussusception in adults. The part played by intestinal parasites in this respect is still a matter of controversy.

(5) Traumatism, more particularly as the result of some form of violent muscular exertion, acts as an occasional cause of intussusception in adults.

(6) Finally, there is an important group of cases in which no causative factor is demonstrable, as in the case here reported.

In a general way, intussusception in adults is more apt to follow upon intestinal ulcers, tumors, diverticula, and traumatism, whereas, in children this disturbance is more apt to be stimulated by acute inflammatory enteric conditions. Tumors, ulcers, and diverticula usually give rise to the picture of chronic intussusception, while traumatism and inflammatory processes are responsible, as a rule, for acute invaginations.

In the explanation of the mechanism of intussusception, the so called paralytic theory seems to have been discarded in favor of a septic etiology. Local contraction of the annular muscle leads to constriction of the affected segment, and this comes to be overlapped by the unchanged segments. Obstruction occurs secondarily, as a result of progressive constriction.

Spontaneous reduction of the intussusception may take place as the result of relaxation of the contracted segment, peristalsis above the invagi-

nation, or spastic contraction below it. So called "lateral" intussusception is very uncommon. Multiple descending intussusceptions are rare, and the same remark applies to ascending invaginations of the small intestine.

In the Gromingen (Holland) Clinic, 15 of 63 intussusceptions concerned adult patients, and tumors were responsible in only three of these cases. Among 6900 autopsies in the Amsterdam Pathologico Anatomical Institute, 19 tumors of the small intestine were noted; 13 of these growths had existed without giving rise to symptoms, while 6 were associated either with perforation or intussusception. In some adult cases, intussusception is evidently produced by gross anatomical changes of the intestinal wall, due to ulceration, infiltration, pedunculated or non-pedunculated tumors. In benign tumors, intussusception is more common, on account of the softness and inertness of the intestinal walls, than in malignant tumors, or in chronic inflammatory processes. The great majority of carcinomatous invaginations are found in the colon. Intussusception of the sigmoid flexure descends towards the anus in the majority of the cases, passing through the anal orifice, so that a visible prolapse makes its appearance, being a true hernia.

The changes following on intussusception, besides obstruction of the intestinal lumen, consist in nutritional disturbances of the invaginated segment from venous congestion to total gangrene, with spontaneous expulsion of the necrotic mass, usually within three weeks. In favorable cases the patient is protected by nature against peritonitis, through early agglutination at the neck of the intussusception. Local ulcers may form as the result of distention or pressure. So called hyperacute cases, leading to death within two days, are rare (2%).

BUZELLO (*Beitrag z. Klin. Chir.*, 1920, Vol. 119, H.3, p. 692) reported an unusual case of chronic invagination of the small intestine in a man of 22 years, due to an internal mucous diverticulum 8 mm. in depth and 6 mm. in diameter. Resection was done and was followed by recovery. Etiologically, it appeared that an intussusception eight years previously had not entirely been reduced on account of adhesions at the insertion of the mesentery, leaving a local invagination which gradually became dilated into a sac. This observation shows that old invaginations, after spontaneous reduction, even with relief of all disturbances, still represent a source of danger on account of eventual necrotic changes of the mucosa and the onset of total intestinal obstruction.

MASON AND LERICHE (*Lyon Chirurg.*, 1920, Vol. XVIII, No. 3, p. 325), who believe that the myenteric plexus plays an important part in the development of intussusceptions, described the case of a man 21 years of age, with a movable tumor the size of a fist in the left lumbar region.

Laparotomy revealed an invagination of the ileo-cecum into the colon, which was easily reducible but promptly returned, so that resection of the intussusception was required. Uninterrupted recovery followed after termino lateral anastomosis between the ileum and transverse colon.

GOBL (*Orvose Hetilap*, 1921, Vol. 56, No. 1, p. 5) in Hungary observed an ileo-cecal invagination due to a tumor, in a young man of 19 years, who was admitted to the hospital with a mass in the ileo-cecal region. By the next day, the tumor had disappeared, but a resistance became palpable in the epigastrium. The operation showed a tumor the size of a small apple, derived from Bauhin's valve, which had become invaginated and passed into the transverse colon. Resection was followed by recovery.

OLIVA (*Riforma Medica*, 1922, No. 25, p. 581) in Italy very recently reported a case of ileo-ileal invagination, in a man of 30 years, with symptoms of acute intestinal obstruction. A tuberculous stricture was suspected, but the operation showed the cause to be a diffuse lympho-sarcomatosis of the small intestine, and the patient died two weeks after the intervention and about five months after the onset of the disease.

In a recent case of enterocolic intussusception in an adult reported by Kingsford, in England (*Brit. Med. Jnl.*, 1921, I, p. 8131), the patient, a man 46 years, was suddenly seized with severe intermittent abdominal pain, accompanied by retching and vomiting. Examination some hours later showed a rounded prominent swelling in the right iliac region, dull on percussion and tender on palpation. The intussusception was entirely irreducible seven hours after onset, probably due to the large amount of mesentery it contained. Laparotomy was performed on the collapsed patient, and it was found that the ascending colon as far as the hepatic flexure, the cecum, and about 6 to 8 inches of ileum were distended by the invaginated small intestine. At the apex of the intussusceptum, which was about 18 inches in length, an oval mass about 2 inches long could be felt, suggestive of a polyp. The ileum above the intussusception was laterally anastomosed to the transverse colon, and the patient made an interrupted but good recovery, after passing the entire intussusceptum with the stools. There was reason to suspect a Meckel's diverticulum as a possible cause of the intussusception.

DELANNOY (*Arch. d. Med. de l'Appareil Digestif*, 1923, XIII, p. 215) reports the case of a woman 55 years of age who was admitted with the diagnosis of intestinal occlusion, after having suffered for about a month from abdominal disturbances, in the form of several attacks of profuse diarrhea. Vomiting until the last three days had occurred only twice. It was only since three days that the disturbances had become seriously aggravated with severe paroxysmal pains

in the left iliac fossa, radiating towards the arms and perineum, and accompanied by rectal tenesmus. No more stools, flatus or blood had been passed by the anus, and the general condition was unsatisfactory. Immediate operation showed the invagination to be situated at the junction of the sigmoid flexure and the rectum, in front of the sacrum. The intussusception proved irreducible; ileo-rectal anastomosis as well as resection by the abdominal route was impracticable on account of the site of the invagination. The application of an artificial iliac anus was therefore decided upon, with the intention of subsequently performing resection of the mass by the trans-anal route. The sigmoid coil was therefore rapidly anchored to the skin and opened, with immediate escape of highly offensive material. In spite of this apparently efficient drainage, the patient's intoxication was not relieved and she succumbed to stercoræmia five days after the intervention.

The diagnosis of chronic intussusception may be extremely difficult and in many instances may not be determined until the abdomen is opened. However, with respect to the seat of the intussusception, its localization in the small intestine is indicated by early profuse vomiting, predominance of obstipation, a small amount of blood in the stools, and a freely movable tumor. Sudden colicky diffuse pains often in the umbilical region, are an important symptom, and so is enterospasm or stiffening of the bowel, which is present in about fifty percent of the cases. There is often no distinct tenderness on pressure. Early vomiting is very common (92%) although nausea and vomiting may be absent. Usually, there is at first obstipation, followed in six to forty-eight hours by a discharge of bloody mucus. Regular bloody stools are noted in only about one half of the cases. Diarrhea is often noted in chronic intussusception and it occurred in the case which will be given in detail later. Painful rectal tenesmus is often present (55%) especially in intussusception of the large intestine. An important diagnostic feature is a relaxed sphincter, a sign met with in fifty percent of adult patients, and practically always in children. The intestinal occlusion is practically never complete, and flatus is usually passed. Abdominal gurgling and splashing without passage of flatus is very suggestive. Flattening of the ileo-cecal region (Dance's symptom) is rarely demonstrable. Examination often but not always reveals an abdominal tumor—which can be palpated in the majority of the cases—varying in size, position and consistency, during the severe colics, or in the interval between attacks. These invagination tumors are seen most frequently in chronic intussusception of the ileum or ileo-cecum. The mass is sausage shaped with a curvature having its concavity towards the umbilicus, and is usually situated in the left side in a proportion of 3 to 1. The discovery of these

characteristic findings affords a sufficient basis for the diagnosis of intestinal intussusception. A change in consistency during the examination is a valuable sign in the differentiation of intussusception from neoplasms or fecal impactions. Otherwise, a neoplasm of the colon may give rise to the same symptoms as chronic intussusception. Appendicitis can be excluded in most cases by demonstrating the mobility of the mass in intussusception and its response to the respiratory movements, contrary to conditions obtaining in appendicitis. In the absence of a palpable tumor, the differentiation from appendicitis and especially from dysentery may prove difficult. When other methods of examination prove unsuccessful, radiography may furnish a valuable adjunct for the elucidation of the obscure symptom—complex. Progressive emaciation is a characteristic sign of chronic intussusception in adults. The course of the disease may extend over months and years, with acute exacerbations. The characteristic feature of the chronic recurrent type of intestinal intussusception consists in the abrupt onset of symptoms of invagination, at variable intervals, between which the patient is in good condition, whereas, in the chronic permanent form there is no complete well being—even between the acute attacks.

TREATMENT

Palliative measures such as water or oil enemas, or air injection into the rectum, may accomplish a more or less complete reduction of the intussusception, in mild and unusually favorable cases, but the results are seldom permanent. Taxis may be attempted under general anaesthesia. Although these palliative measures are quite promising within the first six to twelve hours after the onset, it must be kept in mind that the operative mortality is very markedly increased after this time. Acute invaginations of over 48 hours duration in adults, and those cases in which severe inflammation or incipient peritonitis is suspected, must be operated upon without delay.

In a general way, once the diagnosis is made, operative intervention is the procedure of choice in the treatment of intestinal intussusception in adults. Concerning the palliative measures—these procedures should never be attempted, unless, the patient is so placed that laparotomy may be done on short notice. In fact the palliative measures should be regarded as a pre-operative procedure—and not a curative one. The disappearance of a tumor is not indicative of complete reduction and hence laparotomy should always follow. The extent of the surgical interference is, of course, entirely governed by the findings in a given case. Manual disinvagination with parallel suture between the detached ileum and colon; fixation of the ileum and cecum to the peritoneum; fixation of the mesentery of the appendix, when this is left be-

hind, into the iliac fossa may be sufficient. However, after the intussusception has been exposed, a combined procedure of compression and traction is indicated for reduction. This attempt should always be made by gently pushing the intussusceptum out of the intussuscepiens from below upward. Pulling should be avoided as much as possible. The treatment is completed by the removal of the cause of the intussusception when practicable. Recurrence after surgical interference is uncommon, and can usually be guarded against by the simple and efficient method of anchoring the affected coil to the lateral parietal peritoneum.

If reduction is impossible by manipulation, the seriousness of the problem is greatly increased. Under these conditions the surgeon has the choice between (a) resection of the entire mass with immediate or delayed re-establishment of the bowel continuity; (b) entero-anastomosis around the mass and secondary resection; (c) resection of the intussusceptum followed by closure of the intussuscepiens. In adults and older children the procedure of choice is resection with immediate entero-anastomosis, preferably end to end. In children the procedure should be more conservative. The application of a temporary enterostomy, followed later on by anastomosis, often has very beneficial results, as has ileo-colostomy with secondary resection in suitable cases. Whichever procedure of resection and replacement of the bowel within the abdominal cavity is adopted the use of drainage should be avoided for the reason that it is a predisposing factor for the development of mechanical difficulties or infection.

In Delannoy's review of the operative results, in 35 recent cases, following statistical data are instructive; eight reductions, simple or with supplementary interventions such as appendectomy or fixation—there were six recoveries and two deaths, making a mortality of 25%; eight latero-lateral anastomosis, with five recoveries and three deaths (including one from peritonitis and one from exhaustion), making a mortality of 37.5% and fifteen resections with twelve recoveries and three deaths, making a mortality of 20%. Of these three deaths one was due to embolism on the fifteenth day; the second concerned a child under six months of age; and the third was due to shock. Resection is thus shown to be the least dangerous procedure, and should be the intervention of choice in chronic intussusceptions.

The Scandinavian surgeon, Winter, whose material is derived from several Copenhagen hospitals, the Malmo Hospital and the Odenk Hospital during the years 1910 and 1921, recently reported 247 cases of intussusception ileus, the total number of cases including nineteen adults, with eleven deaths. Based on personal experience and a review of the literature, he arrived at the conclusion that primary surgical

treatment is best and should be applied in the first place. The sooner the patient comes to operation, the better is the prognosis.

The following case is reported in some detail because it presents several interesting features:

Mrs. E. M., 68 years of age (St. Vincent's, 3178-22), was brought to hospital August 2, 1922, complaining of recurrent colicky pains in abdomen, nausea, vomiting, intermittent diarrhoea and great prostration. Investigation revealed that illness was of six days' duration, having a sudden onset. The pains were referred to umbilical region. Shortly after onset nausea, vomiting and diarrhoea were associated with the pain. The vomitus at first was bilious in character, but for the past 48 hours has been brownish in color, with a distinct fecal appearance and odor. On the third day the pain gradually disappeared after the use of enemata, which were expelled spontaneously, accompanied by passage of considerable flatus and mucus. On the fifth day the mucus was noted to contain a small amount of blood, and fecal matter. On the sixth day pains recurred with greater severity and patient was unable to take any nourishment or fluid by mouth.

Previous History—Patient stated that she has had several similar attacks, but of much less severity and shorter duration. Relief always obtained by the use of enemata and cathartics along with total fluid diet. However, during past six months attacks have been more frequent. Never noticed any blood or mucus in stool until present attack. There is no history of previous operation or constitutional disease.

Physical Examination—Patient is a well-nourished and well-developed woman of 68 years—appears much younger. She presents signs of being quite sick and every few moments grimaces with acute abdominal pain and occasionally vomits what appears to be fecal matter. Eyes clear. Tongue covered by brownish material, with foul odor to breath. Heart and lungs normal. Abdomen distended, but not rigid or tender. An indefinite mass is palpated in left lower quadrant, which is symmetrical and not tender. Tympanitic percussion especially in upper abdomen. Temperature 100, pulse 90. Blood pressure 100 over 60. Blood count—Haemoglobin, 72%; W. B. C., 11,000; Polys., 74%.

Provisional Diagnosis—Incomplete intestinal obstruction. The immediate treatment consisted in high compound enema, which was expelled spontaneously with considerable mucus and flatus, and afforded great relief. Subcutaneous saline (1000 c.c.) given. The period of rest continued for six hours, when fecal vomiting recurred, followed by return of most intense pain. Enema was repeated and brought out mucus and blood but no feces. Tumor could now be demonstrated as well as visible peristalsis. Diagnosis—Intussusception. Saline by hyperdermoclysis 1000 c.c. given and immediate operation performed.

Through a straight incision between umbilicus and symphysis a large, freely movable tumor was delivered. The bologna-shaped mass was found to be an intussusception of jejunum into upper ileum, measuring about 16 inches long, and 7 or 8 inches in circumference. The intestine above and below the mass was markedly edematous and hypertrophied. At the root of the mesentery of the mass a definite venous thrombus was demonstrated, yet the color of the intussusciptens was good. Reduction was found impracticable and complete resection was done, followed by a suture end-to-end anastomosis. Soling of the peritoneum was avoided, principally because the excision and anastomosis were done outside the abdominal cavity. A noteworthy fact was the entire absence of free fluid in the abdominal cavity, yet the obstruction was almost complete. The abdomen was closed without drainage.

Pathological Report—Macroscopic Examination:

The specimen, measuring about 250 mm. by 40 mm., consists of an invaginated intestinal loop. On longitudinal section three free intestinal layers without adhesions are found. The intussusciptens presents two small ulcers measuring about 8 mm. in diameter. The intussusceptum is decidedly hemorrhagic, edematous and undergoes necrosis. The neck of the intussusception is markedly contracted.



Intussusception, small bowel. Female, age 68. Recovery. (St. Vincent's, 3178-22.)

Microscopic Examination: Intussusciptens. Shows an ulcerated mucosa somewhat edematous and moderately infiltrated with small round cells. Intussusceptum. Shows an inflamed mucosa presenting a decided infiltration of lymphoid elements, a large amount of extravasated blood and a large amount of hemosiderin. Wide necrotic areas are seen. The blood vessels are medium size, show a moderate hyperplasia of the intima.

Diagnosis—Intussusception with simple ulceration of the intussusciptens and necrosis of the intussusceptum. No evidence of malignant process or specific inflammatory reaction could be found.

The postoperative course was very satisfactory. Replacement of body fluids by repeated hyperdermoclysis was administered with highly beneficial effects. No vomiting occurred after operation. The operative wound healed per primam. She was out of bed on the fourteenth day and bowels moved naturally from the fourth day on. She remained in the hospital for a period of six weeks because of an out-of-town residence. Date of discharge, September 12, 1922. Follow-up notes show that patient was seen February 26, 1924, when she reported that there has never been a recurrence of pain or constipation, and that she enjoys excellent general health. Had gained 40 pounds since operation.

The favorable outcome in this aged patient is especially gratifying in view of the fact that the mortality of intussusception is still considerable, affecting one-third to one-half of the cases, although, of course, higher in acute than in chronic cases. The majority of deaths are not the result of diffuse peritonitis, but are usually due to purely toxic causes, as the result of absorption of enterotoxins, or septic thrombosis.

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ANALYSIS OF 1000 CONSECUTIVE OBSTETRICAL CASES

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By analyzing a large group of obstetrical cases some important points are brought out and this study of cases from St. Elizabeth's Hospital was undertaken with the desire to see where our clinic stood in the various phases of obstetrics and published with the hope of adding some mite to the knowledge of the subject. Before comparing one statistical report with that from another institution the general nature of the hospital should be outlined, for that may have much to do with the results achieved. In St. Elizabeth's we accept maternity cases at any stage of prenatal or post-partum period, that comes in or are sent in, regardless of previous care or morbidity. While we have a prenatal clinic it takes care of a small proportion of our House cases and many of the private cases were cases referred to various members of the staff, after consultation with private physicians, because of some abnormality.

These 1000 consecutive cases represents a little over one calendar year's work and as said above are consecutive cases as they appear in the files, regardless of private or house service cases. To obviate the human error in recording analysis 750 cases were read and analyzed by the writer personally and the remainder by his assistant, Dr. Charles D. Smith.

CHART 1

SHOWS GRAVIDA AND PROPORTION OF SEXES: 1003 children were born to 999 mothers; 4 pairs of twins.

Para	1	515	Para	6	16	
"	2	224	"	7	8	Males 527
"	3	122	"	8	4	Females 476
"	4	69	"	9	1	
"	5	41	"	10	3	

CHART 2

SHOWS DIAGNOSIS OF POSITION

O-L-A	867	Breech	34	Prolapsed Cord	2
O-D-A	60	Hand	1	Placenta Previa	3
O-D-P	22	Footling	3		
O-L-P	3	Transverse	2		

CHART 3

SHOWS TYPES OF OPERATION, and in explanation of this chart the cases are divided as to house or private cases. The vast majority of our cases at the hospital are "house" cases and it will be noted that very few forceps were used; while almost all the private cases had some type of operative termination of labor, usually the prophylactic low forceps.

High Forceps:

House cases	4	Private cases	24
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Mid Forceps:

House cases	15	Private cases	54
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Low Forceps:

House cases	49	Private cases	140
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Total forceps:

House	68	Private	218
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Version	12	Bags in conjunction with forceps	3
Caesarean	15	Manual dilatation in conjunction with either version or forceps	5

Other diagnosis showed 10 cases of toxemia of pregnancy, of whom 8 were discharged well and 2 died; 7 living babies were discharged well; 3 babies died, 1 was stillborn, 1 died on the third day and 1 on the fourth day post-clamptic and apparently as a direct result of the maternal toxemia. One case of hemorrhage of new-born was controlled by injections of human serum. One mother was admitted 6 hours post-partum with baby and one mother was discharged not in labor.

CHART 4

SHOWS MORBIDITY. In ascribing morbidity no two clinics take the same criterion and this is important in comparative statistics, for one report will take a temperature of 100.5 for two days or more as a basis, while another may use 101.5. For this paper the writer took a stricter basis than is usual, calling every case one of morbidity which had a temperature of 99.8 for 36 hours or more. Actual count shows that 44 cases under this heading of morbidity had a temperature of this degree less than 72 hours. Thirty-two cases showing morbidity were in the hospital longer than 13 days, which is our usual day of discharge; the longest being 27 days and the average of these 32 cases being 21 days. Of cases recorded under this heading the average number of days which fever lasted was 4.18 days. The first 13 days after entrance has been divided into periods to show on the chart the period when temperature started; those classed as irregular were cases where it was impossible to assign them to any particular period. Also the chart shows the various types of operation which showed temperatures and some of the diagnosis made as to causation of temperature. Those which are not classified under definite diagnostic headings were of short duration and where diagnosis was in doubt and could only be classified as mild supprellas.

1st to 3rd day	12 cases	Forceps	40 cases
3rd to 5th "	38 "	Caesarean	7 "
6th to 8th "	12 "	Breach	2 "
9th to 11th "	23 "	Version	1 "
12th to 14th "	9 "		
Irregular	25 "		

Breast Abscess	5 cases	Follicular	
Breast Congestion		Tonsillitis	3 cases
(without abscess)		Vincent's Angina	1 case
	8 "	Acute Pyelitis	2 cases
Bronchitis	6 "	Abscessed Tooth	1 case
Acute Coryza	1 case	Phlebitis	1 "
Influenza	1 "	Acute Salpingitis	3 cases
Lobar		Septicemia (2 of these entered	
Pneumonia	1 "	hospital septic)	3 cases
Pulmonary		Ruptured Bladder	1 case
Tuberculosis	1 "		

CHART 5

SHOWS INFANT MORTALITY. All babies who died at any time while in hospital are recorded under this chart. There were 55 infant deaths or stillborns, one being a set of twins, or a baby mortality of 5.5%. Causes of death are shown in chart.

Stillborn	Normal Delivery	14
"	Premature	2
"	Premature Breech	1
"	Placenta Previa	2
"	Detached Placenta	2
"	Breach Delivery	1
"	Forceps Delivery	3
Monstrosities		5
Spina Bifida		1
Macerated Foetus		5
Post-Eclampsic		2
Cerebral Hemorrhage		5
Cervical Cellulitis Acute		2
Born before entrance, died 6 hours later		1
Twins, one died 2nd day and other on 15th day		2
Babies for whom no adequate cause of death was found on records		7

MATERNAL MORTALITY is recorded in Chart 6, with a brief history of each. There were 5 maternal deaths, or mortality of one-half of one per cent.

CHART 6

Mrs. A.—Admitted as impending eclampsic, with B. P. 160/105; albuminuria; slight edema of face; marked disturbance of vision; severe frontal headache. Given intensive medical treatment for condition without relief of symptoms. Eye examination by ophthalmologist showed much destruction of retina. On second day after entrance symptoms became rapidly worse and B. P. went to 190/150 in three hours; decided on Caesarean to deliver baby, which was done; two hours after operation patient took convulsions and died.

No. 5727—Para VIII. Entered hospital in labor; delivered of monstrosity. On 5th day developed phlebitis of left leg, which was treated by elevation, ice bags and rest; on 15th day post-partum, while in bed, patient suddenly became cyanotic and died. Cause of death, embolus from site of phlebitis.

No. 4009—Entered hospital with impending eclampsia. Albuminuria, headaches, eye disturbance; pain in gastric region; B. P. 185/125; marked edema of face and hands. After consultation with family decided to do Caesarean. Caesarean done, classical type, without difficulty and with living baby. Mother died on 5th day of septicemia.

No. 6305—Para IV. Entered hospital after treatment at home for three weeks with diagnosis of placenta previa. Examination at entrance showed patient in poor condition; pulse, 140; temperature, 101.5; packing in vagina and cervix. After stimulating patient and removing packing, patient delivered by obstetrician on duty. Patient ran continuous septic temperature and blood culture showed hemolytic streptococcus. Patient died on 30th day post-partum.

No. 5728—Entered hospital in labor and examined by house surgeon, who found nothing abnormal in general physical condition. Patient in second stage of labor with fair pains and making good progress, when it was noticed that she became cyanotic and dyspneic. Stimulation given and examination showed heart sounds weak and irregular and "distant." Visiting obstetrician on duty sent for and while he was delivering patient she suddenly became pulseless and died. Diagnosis: Acute cardiac dilatation.

In the above report no comparison has been made with the reports from other hospitals or from vital statistics, because such reports show such varied results; that comparative reports from hospitals in this State would be of value is the writer's opinion, because then the results would be from patients in about the same economic and living conditions and from hospitals keeping about the same standard of practice. Our mortality of 5 cases in 1000, or one half of one per cent, is low but not low enough. While the general mortality in the community in Obstetrics is much higher the writer feels that by constantly drilling on the subject and impressing on the patient and physician the necessity of constant care during the entire obstetrical period we will gradually lower both morbidity and mortality to an ideal state.

Statistics show that the yearly per capita expenses of coffins in this country is 65 cents but health service costs only 11 cents.

SHOULDER PAIN AS AN INDICATION OF RUPTURED ECTOPIC PREGNANCY*

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THE year just passed has seen the publication in several medical periodicals of articles relating to phrenic shoulder pain as a symptom of pathologic conditions in the abdomen, and the attention of the medical profession has been directed toward this as a recent discovery in diagnostic technique. Actually, however, the knowledge of the value of shoulder pain as a diagnostic indication has been available for some time, a lucid explanation of the mechanism by which the pain is produced having been made as far back as 1890, when John Ferguson¹ pointed out that "the phrenic being a sensory nerve, it becomes apparent at once that irritation of this nerve would be capable of irritating the cervical nerves from which it springs, and thus we would find pain in the back of the neck and on the apex of the shoulder. In 1911 Leonard J. Kidd² made a detailed study of phrenic shoulder pain in the course of an examination of the sensory functions of the phrenic nerve, and three years later an account of the clinical manifestations was given by Oehlker³.

A few days before Rubin⁴ published his article, I had operated upon a woman with a ruptured ectopic pregnancy in which the shoulder and neck pain was so marked before the operation that it gave rise to considerable discussion as to its cause and also as to whether the patient was suffering with gall bladder disturbance. The sudden disappearance of the pain following operation stimulated me to an investigation. None of the books on Gynecology mention this symptom, the only mention I was able to find in American literature being in a book by Behan⁵ on "Pain," published in 1914. Behan, in his article on "Extrauterine Pregnancy," says that "in some cases the pain is referred to the shoulder. In these cases it is possible that the blood may extend as high as the diaphragm and so irritate it; the irritation, in turn, is transmitted through the phrenic to the supraacromial nerve, and so causes pain to be referred to the shoulder."

Inspired by Oehlker's investigations—when the end of the war period again permitted study of those medical problems which pertain to increasing the population instead of exterminating it—Hans Dawes⁶ investigated the relation between shoulder pain and the occurrence of rupture of ectopic gestation, and published his observations in September, 1922. Almost simultaneously Zachary Cope in London⁷ contributed a clinical study of phrenic shoulder pain, wherein, among a number of other conditions producing this symptom, he makes special mention of extrauterine pregnancy. "Sudden hypogas-

tric pain associated with symptoms of collapse and accompanied by shoulder pain in an adult woman should make one think of ectopic gestation. If the pain is felt over both clavicles or over the right clavicle, the diagnosis of ruptured ectopic pregnancy is almost certain."

A similar study of this pain was made by Orr⁸ and published in May of last year, but in this no especial emphasis is laid upon ruptured ectopic pregnancy as the causal factor. Before Orr's publication, however, one appeared in Germany antedating it by two months, where, among the symptoms of tubal rupture which the author had found most unfailing, phrenic shoulder pain was conspicuously mentioned⁹. Herzfeld, the author of this article, makes careful reference to those who had preceded him in the investigation of the relation between phrenic shoulder pain and ruptured ectopic gestation, but in this respect he is not imitated by Rubin, who, a few weeks later⁴, made public in this country what he leaves us to assume are entirely independent and original observations upon the subject.

At the same time that Herzfeld in Germany and Rubin in New York were making use of this diagnostic evidence in their respective clinics, Cederberg¹⁰, at Wiborg in Sweden, was doing the same thing, acknowledging his indebtedness to Oehlker and the others, for first inspiring him to make use of it.

It is thus evident that, though the general knowledge of the importance of this relationship is not so generally recognized as it should be, it is absurd for any one at the present day to put it forth as a new and original idea.

Phrenic shoulder pain may be defined as a painful sensation experienced on the top of the shoulder in consequence of an irritation of the terminations of the phrenic nerve. The referred pain caused by such irritation is felt over the area of skin supplied by the same spinal segments which give origin to the phrenic nerve. In general, it is felt throughout the areas supplied by the descending cutaneous branches of the third and fourth cervical nerves³. Though there still exists some difference of opinion as to the distribution of the phrenic nerve, it is fairly well established that the nerve supplies sensory branches to both the pleural and the peritoneal surfaces of the diaphragm except at the rim, where both surfaces to some extent receive sensation from the sixth to the twelfth intercostal nerves⁷. As the central portion of the diaphragm is innervated by the phrenic nerve, irritation of this portion will cause pain in the neck and shoulder on the corresponding side.

Thus we see that pain in the shoulder region associated with rupture of an extra-uterine pregnancy can be caused only by a flow of blood

*Read before the staff meeting of the Providence City Hospital, April 16, 1924.

to the subdiaphragmatic region. In general the pain will be felt in the shoulder corresponding to the side on which the rupture has occurred, but if the hemorrhage be very profuse it may spread to such an extent as to produce bilateral pain. Cedarberg observed that the pain occurred in paroxysms of extreme severity and that it was aggravated by deep respiration. The majority of his patients referred the pain to the right side alone, but in at least one it was strictly limited to the left side, and in several both sides were affected, with occasional radiation down the arms. The right shoulder was painful in one case where the left tube was ruptured, which offers evidence against the theory that the location of the rupture can be deduced from that of the shoulder pain. Dewes also made similar observations.

My own experience with this diagnostic indication is limited to one personal case, and two occurring in the practice of my colleagues. As the first time I encountered the shoulder pain I was unacquainted with the investigations which had been made in Germany and England concerning it, I was greatly puzzled to determine what relation, if any, existed between the abdominal condition and the intense pain in the shoulder of which my patient complained.

Even when the examiner is on the alert to make use of the diagnostic aid offered him by the phrenic shoulder pain, he may experience some difficulty in differential diagnosis. The shock and collapse—the indications of sudden internal hemorrhage which frequently follow rupture of an ectopic pregnancy—are not often seen in other abdominal conditions which cause irritation to the diaphragm. When there has been perforation of a duodenal or pyloric ulcer the pain is usually felt in the right supraspinous fossa or over the right acromion process; less commonly the patient will locate it above the right clavicle. Rupture of an infected gall bladder may produce the pain, but as a general rule in gall bladder conditions the pain will be referred to the right supraspinous fossa, or, occasionally, to the acromiodeltoid region⁶. Cope, however, states that if "the question is put as a routine" to all patients complaining of pain in the shoulder who are suspected of being cases of ruptured ectopic gestation, "it will be found occasionally that pain is complained of in the supraspinous fossa and over the acromioclavicular joint and deltoid." It is evident that the diagnostic value of this pain is largely dependent upon the clinician's ability to correlate it with the other indications found in the abdomen and elsewhere.

CASE 1. Severe pain in the right side of the neck, shoulder and scapular region. Ruptured right-sided tubal pregnancy, with much blood free in the abdomen and many clots in the pelvis.

M. S., 36, married ten years and the mother of four children, the youngest being three years old. There have been three abortions, the last on December 12, 1922, which took place at the sixth month of

gestation. Menstruation has always been regular, the last period being on February 13, 1923. Up to the present illness the general health has been good.

While running on the evening of April 11 she was seized with a violent pain in the right lower abdominal quadrant, followed by slight faintness. She recovered in about three hours, and the next morning—except for some soreness in the abdomen—was in her usual state of health and able to attend to her household duties. On the following day, however, there was a second attack of pain in the right lower abdomen, more severe than the first and quickly radiating all over the lower abdomen, accompanied by pallor, vomiting and collapse. An hour after the initial attack she began to complain of stabbing, spasmodic pain on the right side of the neck, radiating to the right shoulder and scapular region, as well as some discomfort in the right hypochondrium. When seen an hour and a half after the attack began she was lying in the right lateral position, apparently in great agony, the pain being aggravated by the slightest movement. She was more distressed by the neck and shoulder pain than by that in the lower abdomen.

Examination: Temperature 98°; pulse 84. Moderate abdominal distention and general tenderness, especially in the right hypochondrium. No bleeding revealed by vaginal examination, but manipulation of the cervix occasioned intense pain, so much so that vaginal examination could not be satisfactorily carried out. It was established, however, by examination under ether anesthesia, that the uterus was not enlarged and no mass was palpable in the sides.

In view of the probability of a ruptured extrauterine pregnancy immediate operation was advised, but this the patient refused at first; later, however, when by 7 P. M. her condition had become markedly worse, consenting. The temperature was now 100° and the pulse 120, with a leukocyte count of 15,000.

Laparotomy disclosed a ruptured ectopic gestation of the right tube, with a large amount of blood free in the general peritoneal cavity. The left tube and ovary were normal.

After the evacuation of the blood there was no more complaint of shoulder pain, and the patient was able to leave the hospital on the thirteenth day.

CASE 2. Bilateral shoulder pains, pain in left chest. Findings: Ruptured tubal pregnancy on right side, moderate amount of free blood and soft clots in pelvis, cyst of left ovary.

P. M., 27, married, two children, the youngest being three years old. Premature birth at seven and one-half months two years ago; abortion at two and one-half months one year ago. Menstruation began at 14 and has always been regular and normal. The last regular period began February 8, 1923, flowed five days and stopped, and flowed again from the 17th to the 19th. No intermenstrual pain. On March 9, 1923, at 6.30 P. M., was seized with severe sudden pain in rectum and extending up into abdomen. The pain subsided enough so that she was able to go out that evening. At 10.30 P. M. the pain increased and she began having pain in the left side of the chest and severe pain in both shoulders. During the night she was given one-fourth grain of morphine sulphate hypodermically. She was seen at 10.30 A. M. the following day by Dr. I. H. Noyes, with the following notes:

Pulse 130, small; temperature 97.2°. Looks pale. Abdomen slightly distended, tender and spastic in lower portion.

Pelvic: Extreme tenderness on vaginal examination, sense of mass in cul-de-sac and both sides. White blood count, 20,000; hemoglobin, 75 per cent.; red blood count, 3,000,000.

She was immediately sent to the Jane Brown Memorial Hospital for operation. At the laparotomy a moderate amount of free blood (one quart) and

soft clots in the pelvis, ruptured tubal pregnancy and cystic left ovary were found. Following operation the shoulder pain disappeared.

CASE 3. Right-sided shoulder pain. Findings: *Large amount of blood in peritoneal cavity.*

E. M., married, aged 32. Mother of three children. The youngest two and a half years old.

When seen by Dr. McCann on July 27, 1923, at 1 P. M., she gave a history of regular menstruation for the past year. In June she had flowed profusely for two days, although the usual length of her period is four days; in July the period had failed to appear and was then two weeks overdue. Five days before she had experienced some pain in the lower abdomen, a little to the left of the mid-line. This pain had subsided and she had felt well until 8 A. M. of the day when she was first seen, being at this time seized with a very severe pain in the lower left abdominal quadrant, causing collapse. Eight hours later very severe pain began in the right shoulder, being of such intensity as to mask all the other symptoms. Vaginal examination, except for tenderness in the uterus, was entirely negative, and there was no vaginal hemorrhage or other flow, so that the diagnosis was obscure.

Laparotomy was performed at 9 that evening, and the abdomen was found to be full of blood, which had induced the referred shoulder pain by irritation of the diaphragm. As both tubes were apparently

normal it was thought that the hemorrhage was due to a ruptured Graafian follicle from the left ovary. Following operation the shoulder pain subsided.

I wish to express thanks to Dr. I. H. Noyes for Case 2 and to Dr. J. H. McCann for Case 3. 243 Broadway.

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CONVALESCENCE VII: HOUSES OF REST IN RUSSIA

BY JOHN BRYANT, M. D., BOSTON

I. INTRODUCTION

A comprehensive review of the available literature on Convalescence had led the writer to conclude that it was and is the French who have most consistently emphasized the necessity for giving adequate consideration to the mental aspects of convalescence.

It was therefore a distinct even if unwarranted surprise, to receive in January, 1923, through Dr. Frederic Brush and Dr. Haven Emerson, two reports upon "Houses of Rest," from the AMERICAN MEDICAL AID FOR RUSSIA, and it is with full acknowledgment of their source that these two reports are included in the present series of papers on Convalescence.

The first of these reports, entitled "Principles of Organization of the Regimen at the Houses of Rest," is by Madame Rykov, wife of him, who bearing the formidable titles of President of the Union Council of People's Commissaries and chairman of the Russian Socialist Federal Soviet Republican Cabinet, is said today to be the mainstay of the Bolshevik regime.

The second paper, entitled "Report of Collegium of the City Health Department at the Presidium of the Moscow Soviet on Houses of Rest," is apparently a routine committee report.

Both papers have suffered somewhat in translation, a fact which seemed to obligate the writer to make a few minor alterations in the context in the interest of clearer and more idiomatic English. It is believed, however, that the orig-

inal flavor persists sufficiently unmodified to leave the reader in no doubt that in both of these Russian papers, the problem of Convalescence is viewed from an altruistic angle which, if sensed, is too rarely voiced in English.

Out of turbulent Russia has come a logical conception of the extent to which, during routine convalescence, the outlook of even the humblest of daily workers may be influenced for good by an intelligent and practical application of known principles of mental occupation, an application which may well be expected to lead to an awakening of the cultural and spiritual values dormant within the average individual worker. Furthermore, it is of importance to realize that such a mental awakening of the patient may be initiated within the normal limits of that unavoidable period of convalescence which to so many recovering patients has come to mean merely a series of days of enforced and chafing idleness, interposed by the physician between the termination of the obvious stage of acute illness, and the day of final discharge of the patient from medical supervision.

In a word, it is possible to cause the average patient to gain something of permanent value both from the mental and from the economic points of view, during what otherwise is a period of total loss of earning power. It is a demonstrable fact that a patient will remain contentedly under observation throughout a reason-

able convalescence, if such a patient comes to believe that, while otherwise incapacitated in hospital, he is actually gaining mentally something that will better fit him to command for himself and for his family, advancement, success, and satisfaction in life, when at last he plunges again into the maelstrom which whirls ever faster without the protecting hospital portals.

A bit Utopian? Perhaps, but since when is it become a crime to hitch one's wagon to a star? Low aim is crime. In medicine, low aim breeds the human leeches who fatten upon and bleed the patient whom the physician by chance has saved from death, yet has failed to guide past serious illness through supervening convalescence into a completed recovery which will express itself not only in renewed economic independence, but in a surplus measure of physical vigor and mental joy in living unattainable without full restoration of mental and physical health.

"To the physician belongs the period of convalescence no less than the period of acute disease." (Vidard-Dupin, 1844.)

"Convalescence is as much a state of mind as of body." (Cleveland Hospital and Health Survey, 1920.)

"The reason why so many invalids remain such, or so many convalescents become invalids, is because the medical adviser fails to complete his work, to appreciate the full significance of his duties, to apply his abilities to the perfecting of his measures—in short to fill in the niche he had modeled for himself." (Taylor, 1905.)

II. PRINCIPLES OF ORGANIZATION OF THE REGIMEN AT THE HOUSES OF REST

The fundamental problem is the accumulation of new working energy, and the refreshing of the organism in general, the nervous system in particular, by a hygienic regimen reinforced by nutrition and, what is of course quite essential, new impressions. The most oppressive factor for the nervous system is monotony, and the most refreshing is novelty and variety. It would not be exaggeration to say that four hours of monotonous work is more wearing on the nervous system than eight hours of varied work. The majority of workers are occupied in monotonous, mechanical and often stupefying work, and the House of Rest should, on the contrary, refresh the organism by new experiences of an opposite character. Of course, it cannot be considered good to have a kaleidoscopic diversity and change of impressions, or of distractions; such change, in turn, is wearing, and therefore harmful.

Rest and refreshment of the mind are best obtained as follows: if the laborer's whole life be spent amidst heavy sharp questions of daily hate, giving rise to irritating and provoking reactive effort of the nervous system, as a general

shadow not only of the environment but also of the work, then, for purposes of rest, it is necessary not only to change the environment (which is accomplished by going to the House of Rest), not only to stop the oppressive monotonous work, but to give a new direction to the mind.

In this connection, it is extremely important that this rest should not be a passive time-spending. The rest must be made active; the person's active attention must receive a proper supply of new, fresh, interesting material for internal consideration, and all this material must result in some sort of raising of the person's culture.

We cannot here discuss the assimilation by the resting person of some definite program. We must not confine ourselves to introducing hygienic rules or habits. The end of the first month of rest should find the worker passing into the next month with a higher intellectual atmosphere; and the entire internal organization of the House of Rest should be adapted to this.

The problem outlined is solved by sufficiently simple means. The Houses of Rest are outside the cities and, by themselves, constitute a very rich material for the resting person's active attention, if that attention be ably concentrated. For the majority of city workers, a completely strange life of nature surrounding the House of Rest will open an inexhaustible spring.

The first object before the eyes is a tree, whole or cut, which the passive look will pass by. Stop the person's attention for a half-hour's inspection, let him read in the concentric circles of the tree's section, its age, explain its biography, its relation to the sun, to the wind, to the soil, its life in day-time, its work at night-time, its means of nutrition, etc., and you will fill the mind and attention of the patient for many hours with excellent material, refreshing and remembered for a long time. Prepare for this the primitive material, a few booklets, a section of a tree, etc., and you will have everything necessary. The grass around the house, its purpose, history, utility, its role for insects, etc., is rich material for analysis for the phenomena of nature (anabiosis). Again, take the sky over the earth, and you will give dozens of wonderful evenings of rest to those living there: on any wide field make a diagram of the stars in the sky, indicating the points of the compass, and locate the Pole Star, the Great Bear, Venus, etc. Do this in the same way as in botany—by planting them there—and thus you will get wonderful cultural value, since up to complete uncovering of its contents, everything is done without special difficulty; here, two or three booklets will be needed. And even in the very preparation of the work of the star-map piece of land, the resting persons themselves will persistently set to work.

No less strange to the working masses is esthetics. Here, too, at the Houses of Rest is the

time to awaken their active attention, time to pass over from passive reception to active esthetic experience, to bring closer to the field of consciousness the unconsciously arising emotions of music, painting, and sculpture. Ask a pianist to do the "Ballad of Grieg," or else Mussorsky, and announce to the audience only the title and author. And, after the presentation, ask each one separately what in his opinion was in the author's mind when he composed the piece. Remember these answers and ask the pianist to repeat the performance. Whether the audience is or is not able to understand it as you and I makes no difference, but it is important that they should pay active attention to the piece, and try to read something into it; that means that you have set them on the road to learning the meaning of sounds, that you have led them into the world of musical analysis. And, of course, this is a definite and correct way to the musical training of the masses. If you further give historical information on this or that thing in music, or if simply the pianist shows or tells the audience that the Ballad of Grieg to him personally illustrates this or that heroic theme, then the attention is fixed, the hearer is given healthy and interesting food for thought, and the goal is reached.

The same way with a number of other things, more or less simple. Place on the table an album of Lavitan, or Michael Angelo, or views of Naples, Rome, etc., and let there be with that album or hanging on the wall copies of Gollandetz, and let some thoughtful person from those who are resting there, or some one of us who has been in Italy or France, come forth; then there is already a special practical artistic conversation, which is new food for the intellect. There is no need to take up too much time with this, but all this material will be of service, and passive wandering in rooms and alleys should, at the Houses of Rest, become a thing of the past, thus giving to physical labor an intellectual atmosphere: concerted life of nature, its chemistry, physics, biology, on live material, esthetics, hygiene, history (of a given place), concrete, living, etc.

For people whose work is intellectual or in offices, there should, on the contrary, be physical activity, especially physical work in the garden, in the fields, etc., where the intellectual can strengthen his weak muscles through practical exercise. Such are the principles which open up a wide prospect of development.

There should be at the disposal of the Houses of Rest certain prepared themes,—on the knowledge of nature, esthetics, history, etc. In a word, there should be available the material for live practical work in these directions, and living specialists should be systematically made use of as intellectuals to add to the cultural resources of the House.

III. REPORT OF THE COLLEGIUM OF THE CITY HEALTH DEPARTMENT AT THE PRESIDUM OF THE MOSCOW SOVIET ON HOUSES OF REST

1. The Health Department, for purposes of the health of the population of Moscow, has founded a number of health sanitariums for sick people. But, in addition to patients with a definite defect in their organisms, an immense number of laborers need to improve their health by means of rest, change of environment, improved diet, being in the fresh air, etc. Therefore, under the auspices of a department whose primary problem is preserving the laborers' health, there should be founded institutions which satisfy the above mentioned demands. Such institutions are the Houses of Rest.

2. According to the Labor Code, every laborer has the right to a two-weeks' vacation. In order that, in those two weeks, the worker should not merely rest, but also improve his health, in order that in these two weeks he may be set up in such conditions as that rest would indicate to him, in such surroundings as a correct healthy life should run to avoid sickness, in order that the laborer be shown the correct arrangement of the day, in order for him to get hygienic habits, and information on physical culture, and steps toward external beauty and mental culture, in order to awaken in him an interest for knowledge and to give him varied but not tiresome distractions and occupations, there is another link in the chain of measures for health preservation; the Houses of Rest.

3. The basic problem of the Houses of Rest shall be the improvement of the health of the laborers; and, on the other hand, no less important, the use of their spare time for the purpose of raising their culture level. As to the former, insofar as the purpose of the Houses of Rest is the establishment and improvement of the workers' health, it is necessary to establish for the Houses of Rest a suitable system of undertakings and activities for the weakened human organism.

This system should, first of all, include: external conditions of life under which a resting person can be set up; i. e., his dwelling, diet, the arrangement of his day, and, on the other hand, special measures which may be necessary for a strengthened metabolism, and improved blood circulation, and the establishing of a balance between the energy received and the energy spent by the organism for the purpose of accumulating that energy.

4. The Houses of Rest should be located in the country, best of all in pine forests, or in their vicinity; if there are none, then in any healthful locality which is not swampy and therefore not infected with malaria. Such houses may be placed even in cities, on sites with gardens or parks; but it must be kept in view that, to rest a nervous system tired out with the monotony of working life, it is extremely im-

portant to have, even for a short time, the greatest possible change of scene and of all surrounding circumstances, for which purpose, country places have a great advantage over anything else. The sites themselves, on which the Houses of Rest should be located, should particularly not be very large. It is not desirable to crowd into one place a great number of people who seek rest, from the standpoint of the wearing effect on the nervous system. Best of all it is, if cottages for 20-25 persons are concentrated into a comparatively small area, near a number of central institutions (club, reading-room, kitchen, dining-room, etc.). The locations, from a hygienic point of view, should be such as to secure the healthy condition of those who rest there at any time of the year and in any weather. Room capacity, ventilation, heating, lighting; amount of free space for staying during the day in bad weather, etc., should be taken into account, in accordance with the requirements of scientific hygiene.

DIET. In connection with the foodstuffs, the amount of calories should correspond to the standard adopted for sanitarium colonies. It is very important to pay attention to a sufficient variety of food and a sufficient amount of fresh (not salted or smoked) products, vegetables, etc.

MAINTENANCE OF CLEANLINESS of the place, the body, linen, and clothing of the people, should be the cornerstone of hygiene at the Houses of Rest, not only for immediate hygienic considerations for the two weeks; but as an aid to the formation of habits, such as conscious desire to transfer that cleanliness also into the conditions of ordinary life. Therefore the Houses of Rest should be supplied with all accommodations necessary for this purpose, from a disinfecting room and a central laundry, to every sort of small conveniences such as lavatories, cuspidors, etc., and they should be assured water in quantities sufficient for all purposes.

ARRANGEMENT OF LIFE should correspond with that at sanitarium colonies, from the standpoint of proper assimilation of food, and day and night rest; but at the same time there should be a certain independence in the way of choice of occupation, and there should be time for various amusements, insofar as this does not interfere with correct life at the Houses of Rest, since, for the purpose of resting the nervous system and decreasing its tension, it is necessary as far as possible to avoid arrangements of a barracks character.

Another group of measures directed towards recovery of health at Houses of Rest have a more special character: these relate to measures aiding improvement of metabolism, establishment of normal blood circulation, balance in turnover of energy, etc. Of these undertakings, there can be two classes at the Houses of Rest: (a) hydropathic, such as douches, and, when possible, baths and bathing in open waters,

with the dosing, temperature, and general methods of taking, under the instruction of, and, as far as possible, individualized by a physician; (b) gymnastics, which must be considered as most essential for such a short period as two weeks, and lessons in the art of "resting," which has an immense significance for the health of the organism.

Thirdly and finally, there should be assured at the Houses of Rest, special medical help, which can be organized by means of the construction of a central ambulatory (with a small ward of 5-10 beds for those groups of houses where there are no hospitals nearby and no opportunity to transport patients), and a contagious ward of 2-3 beds; also, an apothecary. Persons who fall ill at the Houses of Rest should go to the hospital receiving station designated for such purpose, until they are sent to the hospital. There, the patients may be kept for several days, according to the character of their illness, especially if they are in need of hospital care, but yet are not suitable cases for care in the general hospital (pneumonia, influenza, etc.). The number of beds, of course, will depend upon the number of people accommodated at the House of Rest. Everyone entering the House of Rest must go through a medical examination, both to separate any sick persons who may happen to have passed the Control point, and also for a certain individualization of the regimen, diet, and such special measures as hydropathy and gymnastics.

Concerning the cultural and educational work, and for the purpose of raising political consciousness, it is necessary to form clubs with a definite staff of conscious and thoughtful leaders who would be able to deal with groups having varied mental development; also, it is necessary to set up central circulating libraries, reading-rooms for general use, organizations for group readings with magic lantern, and opportunities for lessons in reading and writing; for those who desire diversion, there should be available the theatre, concerts, lectures, the organization of excursions, group exercises, and sports of all kinds (among other facilities, a gymnasium and the necessary gymnastic apparatus).

More detailed plans, both in the educational and physical culture fields, should be outlined and controlled by the organizations controlling physical culture education outside the schools.

5. For the purposes of efficiency, economic administration, and medical inspection, the Houses of Rest should be arranged in groups of 100-200 beds each and no more. Each group should have a club, a central library, its own instructors on culture and educational work, physical culture, its own medical inspection, ambulatories with receiving stations and quarantines, baths and disinfecting rooms; but laundries should, insofar as possible, be built for not over 100 persons.

As locations for Houses of Rest, villa settle-

ments might be used, but only those with the larger cottages having accommodations for at least 20-25 people; also, monasteries located close together and not far from railroads (with their attached villas and settlements), might be adapted; also, private estates in the vicinity of Moscow or of other cities, when surrounded by gardens, and if possible on the bank of a river. The settlements of the Houses of Rest should be completely separated from children's colonies. In addition to the locations having to fulfill the present needs of sanitation and hygiene, they should also have the character of beautiful and comfortable dwellings, thus developing an esthetic feeling in the people resting there. For this purpose, an artist-architect should be placed on the staff of the Section of Houses of Rest. (We reject the Petrograd system of building the bedrooms after the fashion of hospitals, in order to economize space.)

Under present conditions, we must restrict adaptations in the line of repair and reconstruction of existing places. Nevertheless, we must immediately prepare and work out a special type for Houses of Rest (work for a sanitary doctor and an architect).

The organization of Houses of Rest is controlled by a special organization, a Section of the Sanitary Sub-Department, organically connected with it. At the head of each group of Houses should be a specially delegated person, with full responsibility, and preferably, though not necessarily, a doctor; but each group must have a physician responsible for all medical and sanitary care. Each individual House must also have its director, discipline being maintained by special regulations.

The routine of admission to a House of Rest is not different from that at sanitariums; i. e.,

the candidates pass through a medical control Commission of the Sanitary Sub-Department, which shall specify whether the given person shall go to the House of Rest, to a sanitarium, or to a health resort. On coming to the House of Rest, everyone goes to the bath, receives from the House of Rest a change of clothing, and all personal clothing is sent to the disinfection room.

The question of diet should be the object of special medical consideration. Supply, equipment, and medical inspection are controlled through the Sanitary Sub-Department, which should also control the question of heating, and the making of improvements; but technical matters of construction are under entirely separate control. Here, in view of the urgency of special hurry, the Section must employ one person and with him an organization to direct and control repairs and reconstruction. It is preferable that such a person be an architect, which would be an advantage in cases involving special decisions of a constructive technical nature.

Neither estimates nor staff can for the present be fixed, but a sufficient advance is necessary. Good means of transportation are quite necessary for quick organization—automobiles and 8-10 business workers, in the capacity of agents, who should be recommended by the Trade Unions. The mode of distribution of places and even their development may be conducted with slight changes, by the Petrograd system, by means of allotting a certain number of places for each union, in proportion to the number of its members, and taking into account the risks of a given industry. This question, in any case, should be discussed more or less in detail by the Trade Union Soviet, and the Health Department.

MEDICAL PROGRESS

RECENT PROGRESS IN PHYSIOLOGY

BY PERCY G. STILES, BOSTON

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THE attempt is here made to summarize certain researches having a definite and tangible interest for the professional reader. It is not asserted that the work referred to is necessarily that which will prove most important for the future of physiological science. For present purposes it is desirable to select studies which are somewhat detached and self-contained while it is probably the incomplete and partially baffled investigation which more surely marks the trend of the main current. The fragmentary and indecisive report which does not make very stimulating reading may, from the very fact that so much is left unsolved, become the starting-point of fruitful advances.

THE ALLEGED TOXIN OF FATIGUE

About twenty years ago an attractive view of the nature of fatigue was presented by Weichardt. This was the conception that the chief condition underlying the lowered working capacity of a tired muscle is the presence in it of a poison comparable to a bacterial toxin. He did not greatly emphasize the influence of lactic acid or other simple products arising from the principal metabolic changes accompanying contraction but postulated a complex protein derivative as the essential depressing agent. The body in question was assumed to be specific and capable of causing the development of an antitoxin.

Superior endurance, the result of athletic training, was thus made to appear like an acquired immunity: the subject must have attained to it as the result of repeated attacks of the disease, fatigue. Transfusion of his blood might be expected to confer a share of his hard-won gains through exercise upon the recipient.

The general judgment of men of science has been that the claims made by Weichardt have lacked sufficient experimental support. They have, indeed, appeared too good to be true. It has been obviously desirable that they should be investigated anew and this has now been done very thoroughly by Lee and Aronovitch^{1, 2}. Cats and rabbits were severely fatigued by being made to run in revolving cylinders. Their muscles were then ground and a juice was expressed from them. Portions of this juice, usually 5cc. at a time, were then injected into the bodies of fresh animals. Two effects described by Weichardt were regularly obtained: there was a tendency to stupor and a marked fall of body-temperature. There were occasional fatalities which may have been due to embolism.

In spite of an apparent agreement between the new observations and the old it is shown that we cannot accept the theories of Weichardt. Lee and Aronovitch have found by control experiments that the juice from unfatigued muscles is quite as depressing as that from the exhausted tissue. The injurious compounds, therefore, cannot have been the products of recent contractile activity. When the work done by the gastrocnemius muscles of frogs is measured through a long series of experiments it is demonstrated that the performance is much reduced by applying the muscle-juice of the cat to the test-object. It makes no difference whether the cat's muscles have been subjected to stimulation or not. When we break down the cell-boundaries of a tissue and release numberless constituents which nature would never have mobilized we invite confusion and misapprehension. This was Gley's objection to much of the technique employed to secure evidence of internal secretions³.

OXYGEN DEBT

It was formerly supposed that the mechanical work which a muscle could do must be strictly proportional to its oxygen supply. For some time it has been established that this is not rigidly true. The conditions admit of some flexibility. It has in fact been shown that under the circumstances of a laboratory experiment a muscle may be made to work for some time in the complete absence of oxygen. The immediate source of the energy released is not an oxidative reaction but a chemical change of an entirely different kind. Oxygen is called for not to make possible the first contractions of a fresh muscle but to restore it again and again to a relatively fresh condition—to postpone the onset of fatigue.

The fact that human muscles are able to perform much work for which there is at the time no equivalent oxygen makes possible athletic spurts of far greater intensity than would otherwise be attainable. The organism is described, picturesquely but accurately, as going in debt for oxygen. To the extent that the balance is disturbed there must be compensation in the after-period. The repayment of the debt is going on during the continued panting of the subject as he rests following his exertion. The chief feature of the peculiar state of affairs which exists in the body when the theoretical need for oxygen has been outrun is the presence of lactic acid. The surprisingly large degree of the possible oxygen indebtedness has been made clear by Hill and Lupton⁴ and by Campbell⁵.

It has been calculated on the basis of an actual trial in which a volunteer rapidly exhausted himself that the metabolism so far exceeded the current oxygen supply that the "debt" amounted to more than 13 liters. This is the amount of oxygen which it must have been necessary to consume in the after-period over and above the ordinary requirements of rest. At the moment when the debt was at its maximum and the prostration extreme—it appears that more than 100 grams of lactic acid had accumulated in the system. The repayment of the debt coincided with the removal of the last of this burden.

Is it profitable to suggest any analogy for this overdrawing of the metabolic account? Perhaps a comparison with the burning of coal may have some value though the parallel is by no means perfect. With a hot fire and a restricted draft the production of carbon monoxide will occur. Later, with a more adequate air-supply, this gas may be burned to carbon dioxide. Under ordinary conditions most of the carbon monoxide will escape further combustion by being swept up the chimney. A corresponding event in the case of lactic acid is not unknown: with strenuous exercise lactates are to some extent excreted in the urine though the loss is not on a large scale. A misleading implication should be noted: most of the lactic acid formed in muscle contraction is not burned but reconverted into glycogen or some closely related substance from which it was previously derived. The energy required for this endothermic reaction is, nevertheless, furnished by the oxidation of a moderate fraction of the lactic acid or some other material.

RHYTHM IN NERVOUS PROCESSES

The results of laboratory study have long since forbidden us to credit nerve-impulses with any qualitative variation. More recently we have learned that they cannot vary, even in a quantitative sense, so as to register the intensity of the stimulation which has initiated them. In the attempt to explain the workings of nervous mechanisms we have been led to make more and more of rhythm as a factor determining the

effects observed. For any combination of gray matter, nerve, and end-organ there may be found favorable and unfavorable rates of excitation. A particularly interesting research in which the work of analysis has been very successfully advanced has just been published by Querido⁶.

The efferent paths between the central nervous system and the smooth muscle of the body are always interrupted by synapses so that two orders of neurons are necessarily traversed by impulses which pass over the interval. We distinguish the preganglionic fibers extending from the central axis to the intermediate station and the postganglionic fibers completing the connection with the contractile tissue. The synaptic interruption may be close to the final destination of the impulses but in many cases it is in a ganglion somewhat remote from this locality. In what light are we to regard such a ganglion? One of its functions, undoubtedly, is to diffuse stimulation into an increased number of channels. Thus, in the case of the superior cervical ganglion the number of the postganglionic fibers is known to be about 30 times that of the preganglionic. Querido presents evidence of another type of service.

His observations have been made upon the third lid or nictitating membrane of the cat. This structure can be made to retract by applying stimulation to the cervical sympathetic nerve below its superior ganglion or to the postganglionic fibers above. The success of the experiment varies, however, with the frequency of the shocks employed. When the postganglionic fibers are excited the rhythm must be between 120 and 160 per second if a maximal response is to be secured. If the stimulation is speeded much above the upper figure it entirely fails of effect. In contrast with these facts, if the preganglionic neurons are played upon the frequency of the stimuli may be varied as widely as from 25 to 250 per second and a full-sized contraction still be obtained.

It seems clear that the ganglion under investigation can convert impulses arriving with a slow rhythm into a departing stream having a much higher frequency. On the other hand it can also act in the opposite fashion: it can reduce to an optimal rhythm impulses having an original frequency in excess of this. A suggestion made some time ago by Cannon⁷ is confirmed. The ganglia found characteristically upon autonomic pathways are found to be capable of modifying the efferent tide of impulses in such a way as to adapt them most effectively to influence the end-organ.

These observations stand related to certain others made by Veach⁸ and by Veach and Pereira⁹. These workers have shown that when the vagus of the cat is stimulated and attention directed to the cardiac sphincter there are particular frequencies which cause contraction and others which regularly produce relaxation.

With skeletal muscle they find it possible to exceed the rhythms which excite contraction and to secure the relaxation of the preparation. This is an unfamiliar phenomenon. It is not demonstrated until the frequency of stimulation is carried above 100 per second. Our laboratory coils with magnetic interrupters do not reach this value and so can be confidently counted on to induce contraction.

SENSORY LOCALIZATION

A method for securing evidence of sensory localization in the cerebral cortex devised some years since by deBarenne has now been used in further important studies by the same investigator¹⁰. It consists in the application of a weak solution of strychnin to the surface of the brain. When many areas are subjected to this measure it is without visible result. When certain ones are involved the animal, upon the withdrawal of the anesthetic, gives tokens of sensation. Strychnin presumably affects the cerebral gray matter very much as it does that of the spinal cord: it puts its mechanisms in a hair-trigger condition and replaces inhibition by excitation. deBarenne speaks of it as "setting fire" to the regions which are brought under its influence. If the sensations of an animal are founded on particular cortical processes they may well be evoked by such a pharmacologic action.

In his early work this experimenter made use of cats. He has now extended his trials to monkeys. He applies the strychnin by moistening with it strips of paper which he lays upon the cortex exposed under anesthesia. By using a colored solution he can detect any spreading beyond the bounds intended. It has been the prevailing impression that sensory functions are localized behind the central fissure. Examination of the alleged sensory area by the strychnin method confirms the belief in the properties attributed to it. But similar reactions can be obtained from a much more extended region than it has been usual to designate. Sensations seem to be experienced when the drug is applied in front of the central fissure over an expanse of cortex which includes the motor areas and extends somewhat beyond their limits.

Of course the sensations of the lower animals have to be inferred from their behavior. But it is not difficult to discriminate between movements which are secondary to pain or other feeling and those which result from direct stimulation of cortical motor centers. The latter are purposeless or, at any rate, serve the interests of the experimenter rather than those of the animal. Strychnin, applied superficially, does not excite the motor areas; that is, it cannot be substituted for electricity. It is suggested by deBarenne that this failure to affect the motor machinery of the cortex is owing to its submergence below the surface.

When a sensory convolution is acted on by strychnin the resulting sensation seems often to

be referred to both sides of the body. If the application is to the left hemisphere and to a spot standing in relation to the upper extremity both the right and the left paws may be shaken as though the attention of the animal were attracted to them. This bilateral association indicates a divergence between the sensory organization and that of the motor equipment with its striking contralateral connections. It might be thought that impulses passed from the excited region of the sensory cortex over commissural fibers to the corresponding locality in the other hemisphere there to set up definite activities. This supposition is not supported by the results of an experiment designed to test it. The sensory area for a part may be destroyed on one side and it will still be found possible to obtain indications of bilateral sensation when strychnin is applied to the intact hemisphere. It is deBarenne's conclusion that the radiation of impulses from the excited cortex is to some lower center, very probably the thalamus.

THE RED CORPUSCLE

An uncommonly interesting article on "The Significance of Hemoglobin" has lately appeared¹¹. It is by Joseph Barcroft, a physiologist who, like the late William M. Bayliss, has always been able to infuse a certain note of charming personality into his treatment of the most abstruse subjects. Only one topic dealt with in this review lends itself well to our present purpose. This is the question why it is better that the hemoglobin of the blood should be carried in the corpuscles than to have it present in solution. Several reasons are stated with convincing clearness.

Four principal points are made. In the first place, if all the hemoglobin normally contained in the corpuscles were dissolved in the plasma the fraction of the osmotic pressure due to colloids would be greatly increased. It is shown

that such an elevation would have disastrous consequences. For example, if the favorite conception of renal secretion is correct, this function could not go on with the blood so altered in its physical character. Second, the viscosity of the blood would also be markedly increased. The resistance encountered in the small vessels would seriously retard the flow through them. The arterial pressure required to maintain the circulation might be too high to be attained.

A third disadvantage inherent in a solution of hemoglobin would result from the hydraulic principle that in any stream the progress of the fluid lags at the borders. The approximately stagnant layer of the marginal blood would contain in the aggregate a great deal of hemoglobin which would be practically removed from the circulation. As matters actually stand the corpuscles have a diameter sufficient to keep them under the influence of the axial current. At least this is true in the capillaries where from moment to moment it is imperative to provide fresh portions of hemoglobin. Fourth, it is not likely that hemoglobin in solution would be retained permanently in the vascular system. If it diffused into the tissues and became stationary its unique value as a carrier would be nullified. In addition to all these considerations it is to be borne in mind that the cells are repositories for buffer substances and on this account as well as the others may be regarded as indispensable.

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THE AVOIDANCE OF INTRAVENOUS GLUCOSE REACTIONS*

BY JAMES L. STODDARD, M. D., BOSTON, MASS.

It seems to be not a very unusual clinical experience to observe an undesirable reaction after the intravenous injection of glucose solution. In such a case the patient has a chill and rise of temperature within half an hour of the injection followed by increasing weakness or prostration. Within twenty-four hours the symptoms largely disappear. Results such as this of course tend to neutralize all the good effects of the procedure.

Many have thought these reactions inevitable. They have considered them the result of using this particular form of therapy in patients having certain particular physiological conditions unsuited to it. Or they have thought that the

use of such hypertonic solutions may occasionally affect the normal, possibly on account of some slight idiosyncrasy that could hardly be raised to the dignity of a pathological state. Or they have supposed them caused by the mode of administration—the solution given in too large an amount, or at too rapid a rate.

Others have supposed that in some way the solution was unsuitable.

Of all the hypotheses that of an unsuitable solution offers the most hope of a clean and complete elimination of the reactions. In two papers published in 1922 Williams and Swett¹ considered the hydrogen ion concentration of glucose solutions. They found that glucose solutions rapidly become acid on autoclaving, or on stand-

*From the Chemical Laboratory of the Massachusetts General Hospital.

ing several hours at room temperature. Thus, a 10% glucose solution of Ph 6.20 upon boiling for twenty minutes changed to Ph 5.17. Another of Ph 6.20 on standing in the laboratory 24 hours was Ph 5.15, and in 48 hours Ph 4.15. Of glucose solutions from three different sources the Ph fresh was between the limits 6.35 and 6.65. After autoclaving they were from Ph 4.51 to 4.59, and 24 hours after autoclaving from Ph 4.56 to 4.50. They found that when the solutions were more acid than Ph 6.5 they were likely to produce reactions, and if more acid than Ph 5.5 they were quite toxic. It was found that if buffered with phosphate tablets the solutions were not toxic.

Unfortunately this work of Williams and Swett seems to have escaped notice, possibly on account of the main title (Hydrogen Ion Concentration Studies). At the time it was published there were only a few cases where the buffered glucose had been used, and it was not certain whether reactions could always be avoided in this manner. Moreover, as they admit, the preparation of the sterile buffer tablets was extremely difficult.

Further, as a matter of theory, it is difficult to understand how the acidity that is developed in the glucose solutions can produce such reactions. The total amount of titratable acid is very small, and one would think that it would be taken care of by the blood buffers. For example, the worst glucose solution as far as acidity goes that the writer tried, had a Ph of 4.4 after autoclaving. The titratable acidity (using phenolphthalein) was only .97 c.c. of N/10 acid per 100 c.c. of solution, or 4.85 c.c. of N/10 acid for a 500 c.c. injection. This corresponds to .485 c.c. of N. acid or .485 millimols. Considering the bicarbonate content of whole blood 22.53 millimols per liter, the addition of 3 millimols of acid per L. would change the Ph approximately .06, according to calculation by the Henderson-Hasselbalch formula, if the added acid acts only by neutralizing an equivalent of bicarbonate. This leaves out of consideration any compensatory regulation of respiration, which would reduce the change, and suppose the solution mixed with venous blood at the same CO_2 tension as before. The experiments of Bock, Field and Adair² of adding acetic acid to blood give similar figures. Consequently if we mix the .48 millimols of acid in the solution with .48 x L. of blood or 160 c.c.

3.0

we produce at the most only this negligible change of .06 Ph. Even more striking is the case where C. P. dextrose is used. In one such solution after autoclaving and standing for 24 hours at 37 C. the Ph was 6.5 and the titratable acid amounted only to .3 c.c. N/10 acid for 100 c.c. solution; in other words less than 1/3 of that just considered, and therefore requiring only 1/3 as much blood to buffer it. Even allowing for the fact that in making an injection a

large amount of solution comes for a short time in contact with a small amount of blood, one would suppose that the change would be compensated for when the blood thus affected became mixed in the general circulation. Such a small amount of acid as there is in these solutions could scarcely produce a recognizable effect even if there were an acidosis with marked lowering of the blood bicarbonate, for the change in the total blood buffer would be too slight.

It must be concluded that an explanation of the toxicity of unbuffered glucose from an acid base point of view is difficult or impossible. Assuming the reliability of the evidence that the acid solution is toxic and the solution buffered by phosphate is non-toxic, we can only surmise a detoxicating effect of the phosphate in an obscure way on an unknown decomposition product of the glucose, neither the toxicity nor its absence probably caused by the variation in the hydrogen ion concentration or in the total amount of acid, but only varying with the acidity changes; or else a hitherto unknown effect of acidity on blood to produce a toxic product.

It may be that the phosphate is related to the harmless and prompt disposal of the glucose or its products in acid solutions as suggested by recent work on the relation of phosphates to carbohydrate metabolism.

Whatever the explanation may be, the buffering of glucose with phosphate apparently is an empirical discovery of practical importance. When the problem came up at the Massachusetts General Hospital of preparing a non-toxic glucose solution the writer felt that there were other possibilities of harm in these solutions. The presence of toxic impurities in the glucose and the possibilities of slips in the sterilization technique were the main points considered. Since the immediate object was to get a solution that would not give reactions, and since all of these possibilities were easy to correct, they were all attacked simultaneously. Consequently no separation of factors can be made, and we do not know the relative importance of their correction in producing freedom from reactions. No doubt from a scientific point of view the factors should have been eliminated one by one, thus going through a long and tedious process in which many patients would have suffered. The method actually followed therefore frees this paper from all really scientific value.

From a practical point of view, the mode of attack appears to have been justified. In the course of the last eight months at the Massachusetts General Hospital intravenous glucose has been used freely without a single reaction. The occurrence of reactions, rather frequent previously, stopped sharply, completely, and, up to the time of writing, permanently, as soon as the revised method of preparing the glucose was put in force. Apparently here lies the answer to the question at the beginning of this paper.

as to whether the cause of the reactions resides in the patient or the solution. It is with a disclaiming of all originality, but with a feeling that this is information that should be better known, and used, that the writer publishes his experience. Certain matters of detail, such as the mode of preparing the buffer, may be additions to previous contributions. In the remainder of the paper will be described the methods used in preparing the solution.

A form of glucose often used comes in bulk in hard lumps of a yellowish or brownish hue. A test of a fresh 5% solution of such a preparation showed a Ph of 4.6 and a titratable acidity of .35 c.c. N/10 NaOH per 50 c.c. solution. After autoclaving for 15 minutes at 15 pounds pressure it had a Ph of 4.4 and a titratable acidity of .484 c.c. N/10 acid per 50 c.c. solution. (These titrations were done with a micro-burette.) The high initial acidity is probably the reason there was no greater change. The oxidative decomposition that results in the production of acid goes slower the lower the Ph (within the limits considered here). Moreover the acids formed are organic and would have difficulty in making a lower Ph than 4.4. Apparently this glucose had free mineral acid in the original specimen. As stated in an earlier part of this paper, a solution made from C. P. dextrose, after autoclaving and standing for 24 hours at 37° C. had a Ph of 6.5 and a titratable acidity of .15 c.c. N/10 acid for 50 c.c. solution. Another lot from a different preparation had a Ph of 5.29 after autoclaving.

The first possibility of reactions eliminated was impurity in the glucose, and it was ordered that the solutions should be made up from C. P. dextrose, which is much more expensive per pound, but costs only a few cents more per 500 c.c. of 5% solution. Distilled water is used.

In the second place rigid rules were made for autoclaving the solution at 15 lbs. for 20 minutes within at the most two or three hours after it was made up. Since the solutions are kept in the incubator warmed ready for instant use, it was considered best to date them and discard them after two days on account of the rapid decomposition of the glucose under these conditions. Since molds occasionally grow through the cotton, especially if the glucose boils up from too rapid release of the pressure after autoclaving (all of this obvious enough to the

physician, but unfortunately not always to the nurse in charge of the sterilizing) a rigid rule was made to swirl the solution, holding it up to the light, just before use, and to discard it if at all cloudy.

The buffer was tubed in 10 c.c. amounts and autoclaved immediately. A tube is added to each liter of glucose just before using. It should not be added before this, because the buffered glucose breaks down more rapidly than the acid glucose. The concentrated phosphate used as buffer should be kept in a warm room, otherwise it is likely to crystallize out in part. If it does this it should be warmed until dissolved, for when part is out of solution the Ph undergoes great alteration.

Detailed directions concerning all these points were posted conspicuously in the sterilizing room.

In preparing the buffer solution monosodium phosphate free from aluminum and heavy metals should be used, otherwise there will be a precipitate after the Ph is adjusted and the solution autoclaved. This is difficult to filter, and prevents the carrying out of the rule never to inject a cloudy solution. The sodium hydroxide solution used is prepared from a saturated solution of the C. P. sticks. The phosphate solution is made by making 142.6 G $\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$ or 161.1 G $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$ up to 500 c.c. with distilled water. To this is added 2.3N NaOH to make a Ph of 7.5. It should take very close to 78 c.c. of the NaOH solution per 100 c.c. phosphate. One should try 25 c.c. amounts of the phosphate solution first, testing them either colorimetrically or electrometrically.

The buffer solution generally becomes about .05 Ph more acid on autoclaving, and about .05 Ph more acid when mixed with the glucose, so that the final Ph of the buffered glucose will be close to Ph 7.4.

Note—All Ph measurements for this paper were done electrometrically with a Type K potentiometer.

I wish to express my indebtedness to Misses Mary Daley, Clara Durgin and M. E. Rourke for technical assistance.

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A PROCEDURE FOR THE CURE OF ANTRAL FISTULAE

BY DANA W. DRURY, M. D., BOSTON, MASS*

In a certain percentage of extractions of the upper second molars, a fistula into the mouth develops, thus preventing healing of the gum. This may show itself almost immediately or not for several days following the extraction.

When such a fistula is present, fluids pass in-

to the nose on swallowing and infection of the antrum begins, even if it were not already present at the time of removal of the tooth. Further, a whistling noise sometimes manifests itself, which is quite troublesome to the individual.

The antrum appears as a shallow groove on

the inner surface of the bone at an earlier period than any of the other nasal sinuses—its development commencing about the fourth month of foetal life. Two plates grow downward from the dental groove, and between them the sockets for the teeth are formed by the development of thin, bony structures jutting across from one to the other.

Crossing the cavity of the antrum are often seen several projecting laminae of bone, similar to those seen in the sinuses of the cranium. Projecting into the floor are several conical processes, corresponding to the roots of the first and second molar teeth. In some cases the floor is perforated by the teeth in this situation. Its walls are everywhere exceedingly thin.

The number of teeth where fangs are in relation with the floor of the antrum is variable. The antrum may extend so as to be in relation to all the teeth of the maxilla bone, from the canine to the wisdoms. I have never seen a case, however, that developed a fistula except from the second molar.

When the fistula has developed, the usual procedure as mentioned in the early literature was to insert a wooden plug in the hole, temporarily, until a silver or gold canula was made to fit the tract. This latter may be worn indefinitely by being fastened to the remaining teeth by clasps. This method involved the establishment of a disagreeable, continuously discharging sinus into the mouth.

This has led to the development of more radical operations, which involve the curettement of the fistula. In long standing cases, this is apparently necessary, and, in the main, gives satis-

*From the Evans Memorial.

factory results. Many cases occur, however, which do not fall into this latter category, and this paper deals with a method which has been developed for their treatment. Seven cases have been treated in this way and in six, or 85 percent, completely satisfactory results have been secured. Essentially it consists of a sterilization of the fistula with mercurochrome 220 and closure of the sinus with Liquor Epistasticus (B. P.). The details are presented in the following protocol of a case taken from the series:

CASE No. 1. Male, 40 years old, married.

F. H.: Father and mother living and well. Otherwise a negative history.

P. I.: Several healthy children. For several months had noticed a recession of the gums about the upper teeth. For several weeks the right upper second molar had been sensitive to heat and cold. An X-ray film of the area showed a large apical abscess. The patient immediately had the abscessed tooth removed under gas anesthesia. Three days following the extraction he noticed fluids taken into the mouth passed directly into the nose. Also on gentle suction with his tongue a reflex was noticed extending into the face under the right eye.

P. E.: Well-developed and nourished man. Physical examination negative—except in the mouth a passage was noted passing into the right antrum.

at the site of the removal of the second molar tooth.

As the patient was particularly averse to any operative procedures the following technique was undertaken. The fistula was daily cleaned by suction of the antrum cavity. The passage was wiped over with a 2 per cent. solution of mercurochrome 220. Allowing the tract to dry out and keeping the saliva away from the area, a cotton carrier moistened with Liquor Epistasticus (B. P.) was applied quite thoroughly to the fistula. Care was taken not to touch any other part of the mucous membrane so as to prevent unnecessary blistering. The frequency of the application depends upon the reaction obtained. Usually treatments are given daily. As the case progressed the aperture was noted as gradually closing in. Within a month the gum line was again continuous, the fistula having been obliterated.

SUMMARY.

1. A method for the correction of antral fistulae is given, suitable for those cases where radical operation is forbidden or inexpedient.
2. The method has been applied to seven cases, with complete success in six, or 85 percent.
3. The method is simple, easy of performance, and entails a minimum of discomfort to the patient.
4. When used, additional drainage into the nasal cavity through the lateral antrum wall is found to be unnecessary.

BOOK REVIEW

Race Hygiene and Heredity. By H. W. SIEMENS. Translated by L. F. BARKER. 120, pp. 178. New York: Appleton. 1924.

As Dr. Lewellys Barker says in his preface to the English translation, this book "contains in compact form a clear presentation of the fundamental facts" of race hygiene and heredity. The early chapters take up the work of Lamarck, Darwin, Galton, Weismann, and in some detail the doctrines of heredity as advanced by Mendel. In the later chapters the way is pointed out toward the utilization of the facts gained by the study of plants and animals in maintaining and improving the human race. The author indicates the following important points now accepted by most biologists and more recently emphasized by McDougall: (1) Fertility among inferior people is greater than among those of more than average capacity. (2) Accordingly, the socially higher classes are slowly but surely dying out. Siemens would think, therefore, that the first task of racial hygiene today should be the attempt to arrest "our certain downfall." Few factors, if any, can alter germ plasma, if one adheres to the fundamental biological doctrine. Selection, however, in which the most capable members of society must participate in greater degree than the less capable in the production of the coming generation, is the main aim of the racial hygiene campaign. Various methods of fostering an increase in the birth rate of those best fitted to propagate the race are suggested.

To those interested in this problem the book ought to be of great value. To the physician, whose contact with many people practically necessitates a knowledge of the field covered by this book, it can be highly recommended. A list of selected references in English and German, with a glossary of technical terms, adds greatly to its value.

Case Records
at the
Massachusetts General Hospital

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN
WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY

RICHARD C. CABOT, M.D., AND HUGH CABOT, M.D.

F. M. FAINTER, A.B., ASSISTANT EDITOR

CASE 10501

MEDICAL DEPARTMENT

A Scotch housewife of forty-five entered July 22 complaining of headache, weakness and pains in the back.

F. H. Good.

P. H. She had measles in infancy. She had one miscarriage before the birth of her last child, and a puerperal operation (perineal repair?) after that birth. She had anesthesia or paresthesia after the last birth. Ten years ago she had slight trauma to the head. She had some burning micturition years ago. For several years she had had dyspnea. Three years ago she had antrum drainage.

P. I. All her life she had had extreme suffering from headaches; not much vertigo. Seven months before admission she had gripe, with the most excruciating headache and an attack of vomiting. This was soon followed by pneumonia. She was in bed five and a half months. In the spring she had pain in the eyes and impairment of vision. This improved. Six weeks before admission, although she was not well, she got up and was about for three weeks. July 3 her menstruation started. For the first two days the flow was more profuse than it had ever been before; it continued for four days more. She went to bed July 3 and had remained there, becoming progressively weaker until at admission she could hardly sit up. Her pains, particularly in the head, shoulders and back, had become worse. The head pain was mostly occipital. During the past month she had a scratch on her hand which bled profusely. She thought she had lost some weight. She had never had much appetite, and for three weeks had had none. During the past three weeks she had noticed no trouble with the eyes except black and blue spots. During the past few weeks she had been troubled by foul smelling pus and blood from the nasopharynx. Ten days before admission she vomited a little. Since the onset she had had tinnitus. Recently she had had some mental confusion and some pain on turning her head.

P. E. A sick looking woman, somewhat apathetic, complaining of headache in the left side of the back of the head. Skin dry, almost sallow. Ecchymoses on both arms, apparently from bruises. In both antecubital spaces were some small purpuric spots, also a few spots over the chest; otherwise the skin was pale and clear. Moderate stiffness of the neck on flexion. Teeth false. Scur on the right breast. Location of the apex impulse of the heart not recorded. No enlargement to percussion. Action rapid. Sounds could be heard in the left back. A systolic murmur all over the precordia. B. P. 135/75. Lungs normal. Abdomen. Liver edge felt 3 cm. below the costal margin in mid-clavicular line. Pelvic examination. Perineum relaxed. Cervix round, lacerated, freely movable. Rectal examination and extremities negative except for the ecchymoses mentioned.

T. 98°-104.2°. P. 73-119. R. normal. Urine. Amount not recorded, sp. gr. 1.022, brownish and cloudy at the single examination, the slightest possible trace of albumin, 4-5 red blood corpuscles and occasional leucocytes per high power field. Blood. July 23. Hgb. 50%, leucocytes 24,000, polynuclears 1%, lymphocytes 99%. Reds 2,400,000, slight variation in size and shape, some microcytes, slight polychromatophilia, 4 nucleated reds. Platelets markedly decreased. At another count the same day polynuclears 1%; lymphocytes 98%, atypical cells 1%. In 100 cells 44 degenerated cells were seen, also two nucleated reds. July 23. White cells for the most part of the large lymphocyte series. Some of them showed the azur granules and the kidney nucleus. The cytoplasm of these cells was in many cases in the form of "tits," as though it had been very active in life. Not a single definite platelet was seen. July 24. Leucocytes 26,000, reticulated cells approximately 0.5%. One cell with a blue nucleus (megaloblast?) was seen to show active pseudopodic motion. There was strong evidence of motion in one reticulated cell, but this may possibly have been an error in observation. July 25 (after transfusion). Smear essentially the same as that of July 22. Wassermann negative. Non-protein nitrogen 33 mgm. per 100 c.c. Uric acid 4 mgm. per 100 c.c. Blood clot negative at three minutes, positive at six, all tubes. Retraction July 22 very slight in one hour, moderate in five hours. Retraction over night, one tube very slight, two tubes slight. Character of clot very poor. Not sufficiently elastic to maintain form when placed on table, easily broken. Proportion of reds to total volume approximately 20 reds to 80 plasma. X-ray. Films of the sinuses negative. Lung markings, both roots, and shadows running to the upper and apical regions on both sides considerably increased. Some mottling in both upper lobes, particularly marked on the right. Outline of the right diaphragm high. Excursion appeared limited.

On fluoroscopic examination costophrenic angles clear. Outline of the left diaphragm normal; excursion good. Angles clear. Plate somewhat overexposed. "Examination should be repeated to confirm findings in the upper chest."

Orders. July 22. Anemia diet. Aspirin gr. v with codein gr. ss every three hours by mouth p.r.n. for headache and discomfort. Tonic* 3 i t.i.d. before meals. July 24. Morphia gr. ¼ s.c. on going to the amphitheatre and repeat half an hour afterwards. July 25. Morphia gr. ½ s.c. Blood pressure, pulse, temperature and respiration every hour during the night and report any sudden change.

Because of the weakness, pallor and blood count transfusion was done July 24, 600 c.c. of blood being given. The red count was 1,800,000 before transfusion; 2,720,000 after it. She had a short chill and rise in temperature after transfusion, but felt well, ate her supper and next morning seemed very lively, cheerful and intelligent. Several ecchymoses on the nose, chin and elsewhere were much paler, and her skin was not so white. At 4:30 she vomited the supper just eaten and a few minutes later vomited several times in succession, watery bile-stained material. The vomiting was not projectile. She was given ¼ grain of morphia immediately and seemed quieter. Fifteen minutes later she was found in a state of coma and could not be aroused. The pupils were not dilated, the pulse was 90 and regular, the blood pressure was 110/90. Half an hour later the pupils became slightly contracted and the pulse began to fall. At 8 o'clock the pulse was 65, the pupils small, the blood pressure unchanged. The respirations were somewhat stertorous. The whole left side could not be moved, although occasionally the right arm twitched. The head was drawn to the left shoulder, and the left side of the mouth was twisted up. The tongue occasionally fell back into the pharynx, but did not shut off respiration. At 9 o'clock the pulse was 44, the respiration 16, the pupils very small. At quarter past nine the pulse was 70 and the pupils started dilating. At 9:30 lumbar puncture was done and 15 c.c. of bloody spinal fluid obtained, initial pressure 188, after withdrawal of 5 c.c. 204. Similar fluid was found four spaces higher. Twenty minutes later the pulse was 140, the pupils wide. The heart became irregular. The patient died without becoming conscious.

DISCUSSION

BY DR. RICHARD C. CABOT

NOTES ON THE HISTORY

I am entirely in the dark at the end of the past history. One could suppose an organic

nervous lesion and one could suppose uremia. But there is nothing that I feel the least sure of up to the point of physical examination.

NOTES ON PHYSICAL EXAMINATION

We do not know why there was a scar on the right breast.

There is nothing wrong with the heart so far as I see.

We have very little aside from purpura. There is nothing in the examination on which we can build anything until we reach the blood examination, and then we know the diagnosis, —lymphatic leukemia. Degenerated cells are very common in lymphatic leukemia. Azur granules are right for lymphatic leukemia. The observation about the cytoplasm is nothing. "Not a single definite platelet was seen." That is important. That accounts for the hemorrhages. The rest of the examination is of no practical importance.

The non-protein nitrogen is normal.

The X-ray makes us wonder whether there are enlarged glands in or about the lungs causing shadows. Otherwise there is nothing in the examination.

We expect a chill with many transfusions. It means nothing.

On July 25 we begin to think of cerebral hemorrhage.

I never knew the pressure of the spinal fluid to be higher after withdrawal. It should come down, shouldn't it?

DR. TAYLOR: I should think so.*

DIFFERENTIAL DIAGNOSIS

Of course the significance of blood in the spinal fluid depends on our being sure that it was not put in at the time of the tap. A man ought to know that from the conditions of the tap. If he is sure he did not put the blood in, then there is a good chance of its showing cerebral hemorrhage when it is so recent as this. Dr. Taylor, is there anything to comment on from a neurological point of view? All that I can see is evidence of cerebral hemorrhage.

DR. TAYLOR: I am sorry that an examination of the abdominal reflex was not made, the loss of which on the affected side is a very definite sign of hemiplegia. There was evidence enough however without that to say that she must have had a destructive lesion about the internal capsule.

DR. CABOT: I have said that this is lymphatic leukemia, and yet there is not an enlarged gland in sight, and no splenic or liver

* (Note by Dr. J. B. Ayer.)—We know that any factor which causes a sudden or permanent rise in cerebral venous pressure will cause increased pressure in the fluid. During punctures it is not at all rare that a patient coughs, holds the breath, struggles, or even breathes more deeply than is normal. All of these acts will temporarily increase spinal fluid pressure, even to a greater extent than is here recorded. In order that conclusions may be properly drawn from a sequence of spinal fluid pressures after withdrawal of known amounts of fluid it is necessary that the patient be in every way completely relaxed. It is almost inconceivable that an increase in pressure following withdrawal of fluid should have pathological significance.

*Tincture nux vomica 3 ii, tincture gentian compound 3 i, water to make 3 iv.

enlargement. How then make such a diagnosis? Because there have been plenty of such cases before. The process may be entirely internal. The process may be confined to the bone marrow, so that the lack of evidence of that sort does not exclude it at all. The hemorrhages she has had before, the uterine hemorrhage and the hemorrhage from the hand, go perfectly with such a supposition.

I can see very little in the X-ray. The only thing that is at all suggestive is on the left side, something that looks like a gland at the hilus. But without expert guidance I should not be able to say anything in particular about that. Otherwise we have here antrum and skull plates which I do not think are of interest. I see no evidence of any bony change.

A PHYSICIAN: Do you know if there are ever any cures of these cases?

DR. CABOT: None. They all die.

I think the spleen will be enlarged, although they did not find it in life.

NOTE BY DR. G. W. HOLMES

The plate of the chest is of such poor quality that one would not be justified in making any definite statements. The most noticeable thing is the high position of the diaphragm on the right. There is no abnormality of shape, and according to the fluoroscopic notes no definite limitation of respiratory excursion. This would suggest a non-inflammatory process below the diaphragm. The increase in the hilus shadows and the prominent lung markings with mottling in the right upper chest could be due to any condition which would cause a general glandular enlargement. The signs are not sufficiently characteristic to make one feel that the patient had tuberculosis.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Acute lymphatic leukemia.
Cerebral hemorrhage.
Transfusion.

DR. RICHARD C. CABOT'S DIAGNOSIS

Lymphatic leukemia.
Cerebral hemorrhage.

ANATOMICAL DIAGNOSIS

1. *Primary fatal lesions*

Lymphatic leukemia.
Leukemic infiltration of bone marrow, spleen, liver and kidneys.
Hemorrhages of the brain.

2. *Secondary or terminal lesions*

Hemorrhagic areas of skin, great omentum, stomach and duodenum.
Fatty metamorphosis of the liver.

3. *Historical landmarks*

Slight chronic pleuritis.
Slightly defective closure of the foramen ovale.

DR. RICHARDSON: The spleen was moderately enlarged,—360 grams. The outstanding lesions were the leukemic infiltration of the bone marrow, spleen, liver, and kidneys, the various hemorrhages mentioned, that is of the skin, of the great omentum, stomach and duodenum, and the astonishing hemorrhages of the brain. There were many areas of hemorrhage in the brain which had fused with destruction, disintegration of large areas of brain tissue.

The other organs were negative. The circulatory apparatus was negative.

DR. CABOT: Was there evidence of any infection?

DR. RICHARDSON: None. We did not take any culture. There was no evidence of infection in the tissues.

A PHYSICIAN: Do these cases usually run a temperature?

DR. CABOT: Yes, and when they begin to bleed we know that the end is near. They may run along with very little in the way of symptoms for months or even years. I am watching one patient in her thirteenth year of this disease. She is perfectly well today, but some day she will have some hemorrhages and fever and will die.

CASE 10502

CHILDREN'S MEDICAL DEPARTMENT

A boy thirteen weeks old of Russian Jewish parentage was referred from the Out-Patient Department April 4. The chief complaint was persistent jaundice.

F. H. Good.

P. H. The child was normally delivered and weighed $7\frac{1}{2}$ pounds at birth. He was breast fed, nursed well, and gained 4-5 ounces a week. At seven days he was circumcised.

P. I. On the seventh day after birth the child became very jaundiced. According to the mother the jaundice was intermittent, appearing for one or two days a week at 4 or 5 p. m., continuing over night and disappearing during the day. Only the cheeks and forearms were affected. During the two weeks before admission the jaundice had become less. His bowels were constipated. For two days he had not nursed well.

P. E. Well nourished. Length 25 inches. Weight 10 pounds $15\frac{1}{4}$ ounces. Skin icteric. Sclerae and mucosae not jaundiced. Anterior and posterior fontanels open, not bulging. Hair abundant, fine. Hair line extended as far down



PLATE I. Age thirteen weeks. Before treatment.

as the eyebrows. Eyes wide apart. Tongue protruded. Neck, thyroid, heart and lungs normal. *Electrocardiogram.* Small complexes in all leads. Normal rhythm. Rate 100. Low potential. $T_2 + 1$ mm. Abdomen distended. Small umbilical hernia. *Genitalia, extremities and reflexes* normal.

T. 97° - 98.4° . *P.* 110-145. *R.* 29-42. *Urine.* Sp. gr. 1.013. *Blood.* Hgb. 65%, leucocytes 13,500, polynuclears 45-70%. Reticulated reds 0.6%. *Wassermann* negative. *Blood chemistry.* *Uric acid* 3.48 mgm. per 100 c.c., non-protein nitrogen 24 mgm., creatinin 1.37 mgm., blood sugar 67 mgm. *Stools* negative. *X-rays.* "Do not believe liver or gall-bladder plates would add any information at this age." Sella turcica visible and not definitely abnormal in appearance. Nothing unusual in appearance of skull.

Orders. Four ounces of S.M.A. milk* when mother does not come in to nurse; six feedings at 6, 9, 12, 3, 6, 10.

April 8 the visiting physician pointed out significant features,—wrinkled forehead, very low



PLATE II. Age thirteen weeks. Before treatment. Shows especially well the short arms and legs.

hair line, pig eyes, almost bridgeless nose, protruding and thickened tongue, short neck, prom-

*A proprietary preparation.

inent abdomen, umbilical hernia, hoarse and thick voice, and a yellow tint to the face. The texture of the skin and hair were the only points out of keeping with the rest of the general picture. The baby was put on two-tenths of a grain of thyroid. April 10 he was discharged to the Out-Patient Department, to be followed up very closely as to weight and pulse rate for the next three months, when it was recommended that a complete blood study should be made.

Records of the Out-Patient Department. April 16. Weight 10 pounds 11 ounces. The baby did not seem satisfied with the nursing. His mother thought his skin less yellow. Examination was as before. The umbilical hernia was strapped. A formula was given for supplementary feeding.** Continue thyroid and other treatment as before. April 23. Weight 11 pounds 6 ounces. Baby had improved considerably. He smiled and was much more active, did not sleep so much as previously, eyes not so puffy. May 6. Weight 11 pounds 14 ounces. Mother reported that he was much improved. May 15. Weight 12 pounds 8 ounces. Condition improved. Orders, increase thyroid to grains 0.5 ($\frac{1}{4}$ grain twice a day). The tongue was less prominent, the bowels more regular, the yellow tint to the face was noticeable only when the child was exposed to cold. May 22. Weight 11 pounds 14 ounces. Continued improvement. The child played more and noticed things more. The skin was of finer texture. The bowels were somewhat constipated. May 26. Weight 11 pounds 12 ounces. Baby more active than ever before and skin warmer. Thyroid grains 0.5 and grains 0.2 on alternate days had been given for the past four days. Formula, whole milk 8 ounces, boiled water 5 ounces, lactose $1\frac{1}{2}$ tablespoonfuls; two ounces after each breast feeding. Thyroid not changed. May 29. Weight 12 pounds just after being fed. Child doing much better, though he regurgitated a little after each feeding. Bowels constipated. X-ray. Heart shadow a little prominent to the left. Supracardiac dullness not increased. No evidence of enlarged thymus. The glands about the lung roots were somewhat increased in size and density. Lung fields clear as far as could be determined. June 2. Weight 12 pounds 4 ounces. Slight color in cheeks. The baby felt very well. No vomiting after feeding. Orders, orange juice, thyroid gr. $\frac{1}{4}$ twice daily. June 16. Formula, whole milk 15 ounces, water 5 ounces, lactose 2 large tablespoonfuls. June 28. Weight 13 pounds. Getting on well, but a little weak; did not sit up. Brighter and tried to speak. Getting three tablets daily. Bowels capricious. Frequent wetting of diaper. Possibly impaired milk supply. Apparently not always satisfied with combined feeding. Still showed cretinoid characteristics,—jowls, sparse hair,

**Whole milk 10 ounces, water 11 ounces, boil three minutes; cane sugar 2 level tablespoonfuls; 3 ounces every 3 hours for 7 feedings.

thick protruding tongue. Skin rather loose and dry on hands. Hernia distinctly improved. Orders: Because of undernutrition—flabbiness and gain of only one ounce in weight—put him on thyroid gr. $\frac{3}{4}$ daily, give $\frac{1}{2}$ ounce more of the formula, also cereal and zwiebach. July 7. Weight 14 pounds 6 ounces. Fine improvement. Getting strong. Tries to sit up, bright, active, playful. Appetite very poor. Bowels normal for the first time. Cretinoid signs less apparent. Hair sparse. Orders: Increase tablets to one grain daily and feed as before. July 23. Weight 14 pounds 10 ounces. Child doing splendidly. Very vigorous and active. Excellent musculature, particularly the abdominal. Unable to sit up as yet. Still breast fed. Cretin qualities hidden until he smiles. Jowls prominent and tongue appeared large. No signs of teeth. August 11. Weight 16 pounds. Came in because of small mass on the right heel and for increase in feeding. Showed continued improvement. Mass on heel to be watched. Continue thyroid one grain daily. September 3. Weight 16 pounds 13 ounces. Two teeth had erupted in the past two weeks, coming very hard. Child seemed much

of yolk of egg daily. Continue thyroid gr. 1 daily. September 17. Weight 18 pounds. Doing well, but still had cretinoid behavior. Tongue protruded and fairly thick. Came in for dry cough which began the night before. Throat slightly raw and red. Orders. 3-5 drops of mixture* in each nostril when lying on back. Codliver oil and phosphorus half an ounce t.i.d. Wine of ipecac 5 drops t.i.d. Increase thyroid to gr. $1\frac{1}{2}$ daily.

DISCUSSION

BY DR. FRITZ B. TALBOT

The features to be emphasized in the physical examination are the yellow tint of the skin with normal sclerae in a thirteen weeks old infant. Jaundice is not present at this age without the yellow tint in the sclerae, and when such findings as these are found one should be suspicious of the possibility of cretinism. An electrocardiogram was taken and showed a low T wave. It has been found in this clinic that a low T wave is characteristic of hypothyroidism. The laboratory tests showed a diminished hemoglobin and a lowered blood sugar, otherwise the blood chemistry was normal. A further and more careful examination showed the significant features of a wrinkled forehead, very low hair line, pig-like expression of the eyes, flat-bridged nose, protruding thickened tongue, short neck, prominent abdomen, umbilical hernia, a hoarse, thick voice, and slightly coarse hair. These findings were sufficiently marked to make a diagnosis of cretinism. The baby was then given thyroid and treatment followed in the Out-Patient Department.

The amount of thyroid was increased so that at six months the baby was receiving three-quarters of a grain a day and at eight months a grain and a half a day.

The important physical features of this case are the data upon which the early diagnosis of cretinism was made. All instances where a yellow tint of the skin, especially in the cheeks, persists after the early weeks in which icterus neonatorum may appear, should be viewed with suspicion. If there is no yellow color to the sclera the burden of proof is on the physician to prove that the child is not a cretin before allowing it to pass from his observation.

Other signs of cretinism were manifest in this case, and it was possible to commence very early treatment. The importance of early treatment is obvious when the eventual mental development of a cretin is taken into consideration. Many authorities do not believe that a cretin can ever be brought up to normal mentality. In this clinic we believe that this failure to develop normally is due to a lack of thyroid during the early months of life when the brain is growing very rapidly. Failure to diagnose cretinism early is



PLATE III. Age nine months. After six months' treatment.

brighter. Ear had to be opened because of abscess. Not yet able to sit by himself, though he tried. Tongue seemed a little large. Except, however, for a slight tendency to keep his mouth open and only slightly suggestive dull expression the child did not look like a cretin. Hair dry and coarse. Fontanel two fingers. Skin soft. Orders: 6 ounces of milk after breast feeding and full varied diet for age, including one dram

*Iodin gr. $\frac{1}{4}$, menthol gr. $\frac{1}{4}$, camphor gr. $\frac{1}{4}$, benzoin $\frac{1}{2}$ i.

common. Most text-books say that it is rarely possible to do so before the sixth or eighth month of life. If it is not recognised before this period and treatment is not commenced, the critical period of greatest growth of the body and especially of the brain is passed before treatment is commenced. If, on the other hand, the condition is recognised early and thyroid is administered during this period of very rapid growth, better results are to be expected. Early diagnosis and treatment have resulted in a few instances in almost complete mental development. It would seem, therefore, that the secretion of the thyroid gland is necessary for the complete development of the "mental" portions of the brain, and, theoretically, that if this development is attained during the critical period, and later in life thyroid omitted, the child will not slip back into cretinism, but will become myxedematous. Renewal of treatment should then bring the patient back to normal again.

The early diagnosis of cretinism consequently is of the greatest importance. Early symptoms and signs which should suggest such a diagnosis are of importance in the following order,—

1. Orange to lemon-yellow tint of the skin of the face without yellowing of white of the eyes.
2. Slightly enlarged and thickened tongue.
3. Slightly hoarse voice.
4. Flattened bridge of the nose.
5. A suggestion of the characteristic pig-like expression of the eyes.

Other signs of cretinism do not appear until the condition becomes more pronounced. It is possible that sufficient thyroid to retard the appearance of the symptoms comes to the baby from the mother's milk. This, however, has not been proved. With increasing age the skin gradually becomes dry and thick, the hair sparse and coarse, and as growth progresses the proportions of the body become abnormal. The trunk continues to grow at almost a normal rate, but the legs, arms, and feet do not, and as a result the extremities are relatively and absolutely shorter than normal. This becomes sufficiently pronounced to result in the characteristic appearance of cretinism, (see Plate II) and the signs outlined above become more marked.

The treatment, of course, depends entirely upon the administration of thyroid extract. Care should be taken to obtain an active preparation. The dosage should be increased with increasing age and size of the child. A baby of three months can usually quickly work up to one-quarter of a grain a day, at six months half a grain a day, and at nine months three-quarters of a grain a day. Sometimes, as in this instance, as much as a grain and a half a day may be given at that age. In other instances a grain and a half cannot be given until some time in the second year. In the third year three grains a day are frequently necessary, and in the sixth year six grains a day may be necessary.

Prognosis. If treatment is commenced after eight months of age growth is quickly stimulated so that the physical proportions of the infant rapidly approach the normal, and the legs, arms, and feet make up for their retarded growth. The mental growth is also stimulated up to a certain point, but in many instances a certain amount of mental backwardness persists throughout life. If on the other hand the treatment is commenced at the third month or earlier and there are no other complicating factors there is reason to believe that both physical and mental development will be normal.

A STUDENT: What is the differentiation by physical signs between an early Mongolian idiot and a cretin?

DR. TALBOT: The time of ossification in the bones of the wrist is delayed in cretinism and normal in Mongolian idiocy.

Although the joints are loose in the cretin, there is extreme flexibility of the joints which is more marked and characteristic in the mongol.

The skin of the cretin is doughy and yellowish, with a superficial dry shiny layer, and the deep layers are thickened. The mongol on the other hand has a smooth, soft skin under which there may be adipose tissue if the nutrition is good. Its color is never yellow. The face of the cretin is pale, yellow and earthy, while that of the mongol is red as if painted. There is marked diminution of perspiration in the cretin. This may or may not be present in the mongol.

The expression of the cretin is apathetic and sometimes anxious, the forehead being wrinkled, while the expression of the mongol is cheerful, stupid and often comical.

The hair of the cretin is sparse, brittle and coarse, while that of the mongol is fine and more normal.

The eyelids of the cretin are thickened and pseudoedematous, while those of the mongol are slit shaped, the outer canthus is tipped up, and there is accentuation of the epicanthic fold.

In the cretin the mucous membranes are thicker, and in the mongol the tip of the nose is like a button.

The behavior of the cretin is stupid and sleepy, while that of the mongol is restless.

DIAGNOSIS

Cretinism.

CASE 10503

SURGICAL DEPARTMENT

An Irishman of fifty-seven, a cook, entered September 16 complaining of cramp-like pain in the lower abdomen of eight months' duration.

F. H. Good as far as known.

P. H. He had had measles or scarlet fever,

and was ill in bed a year after it with fever and a "stomach cough." He recovered completely. At twenty-seven he had a bad case of Neisser infection, poorly treated. At thirty-seven he had a peritonsillar abscess lanced. The same year he had influenza. He had very rare headaches and very occasional tinnitus.

Habits. He drank 8-15 glasses of beer daily when it was available, and had taken some since prohibition, with gin, etc. He smoked fifteen pipes daily. For thirty years he had been a cook, working often under pressure and eating irregularly.

P. I. Five years ago he began to have a full, heavy feeling in his stomach after eating. This was present off and on until a year ago. Then he had constipation, requiring salts once or twice a month. He also noticed an occasional blood streak and grayish slimy masses in his bowel movements. Ten months ago he began to have cramp-like pains in the lower abdomen, making him feel he could not get to the stool quickly enough. Often he could pass little or no fecal material and the sensation would soon pass off. These attacks soon came seven or eight times daily and two or three times at night. The mucus and blood streaks persisted. Sometimes during the past five months the stools were tarry black. Four months ago he had X-rays and a proctoscopic examination at a Boston hospital. Both were negative. For two months he had had occasional nausea, relieved only by a peppermint medicine given by his physician. He had never tried soda with benefit. During the past month the cramp-like pain had not been so generalized as formerly, but tended to radiate toward and sometimes to the genitals and rectum. Tenesmus, however, had been a rare occurrence. Since the onset of the diarrhea his bowels had moved without catharsis. He urinated two or three times at night. Two years before admission he weighed 168 pounds, his best weight. His present weight was 155. There had been no recent loss, in fact he thought he had gained three pounds in the past month.

P. E. Slightly obese. Chest emphysematous and barrel shaped. **Lungs.** Rather loud bronchial breathing over the left posterior axillary line. **Heart** enlarged to the left. Apex impulse not found. Percussion measurements as shown in the diagram. Sounds very indistinct and distant. No murmurs made out. **B. P.** 110/80. Pulses and arteries normal. **Electrocardiogram.** Normal rhythm. Rate 90.

Abdomen protuberant, very poorly relaxed, so that palpation was almost impossible. **Genitals** rather infantile. Rings slightly relaxed. **Rectal** tone good. Prostate broad and tender.

Pupils and **reflexes** normal. **Fundi.** Thick walled small calibered vessels with engorged veins. Very red retinae with fuzzy appearance, especially in the left eye, where the details were blurred and the discs obscure.

Before operation **T.** 97°-101.4°, **P.** 70-100, with a rise to 125 the morning of operation; **R.** normal; **urine**, amount not recorded, sp. gr. 1.022, no albumin or sugar; **blood**, hgb. 90%, leucocytes 13,000, polynuclears 81%; **Wassermann** negative; **stools**, jelly-like red fluid at one examination, slightly yellow-red streaks at another, red at the third. Guaiac very strongly positive at all. Mucus and macroscopic blood at two. **Gastric analysis.** **Fasting contents.** 55 c.c. slightly turbid white material with mucus. No free HCl. Total acid 6 c.c. N

10.
Guaiac negative. Microscopically no blood; many pus cells. **Test meal.** 35 c.c. white flocculent material. Free HCl 35 c.c. N Total 10.

acid 54 c.c. N Guaiac negative. Microscopical 10.

ly as above. **X-ray.** Barium enema revealed an irregular filling defect in the sigmoid with partial obstruction of the barium column at this point. (Conclusion withheld.) Right upper chest slightly less radiant than left. Markings throughout this region were increased in size and fuzzy in outline. The changes extended well out into the periphery of the lung. There was no mottling, however, in the lung substance. The hilus shadows were not increased. The diaphragm was in its usual position. No limitation of respiratory motion. Heart shadow appeared normal. Aortic knob a little tortuous. No definite pathology found.

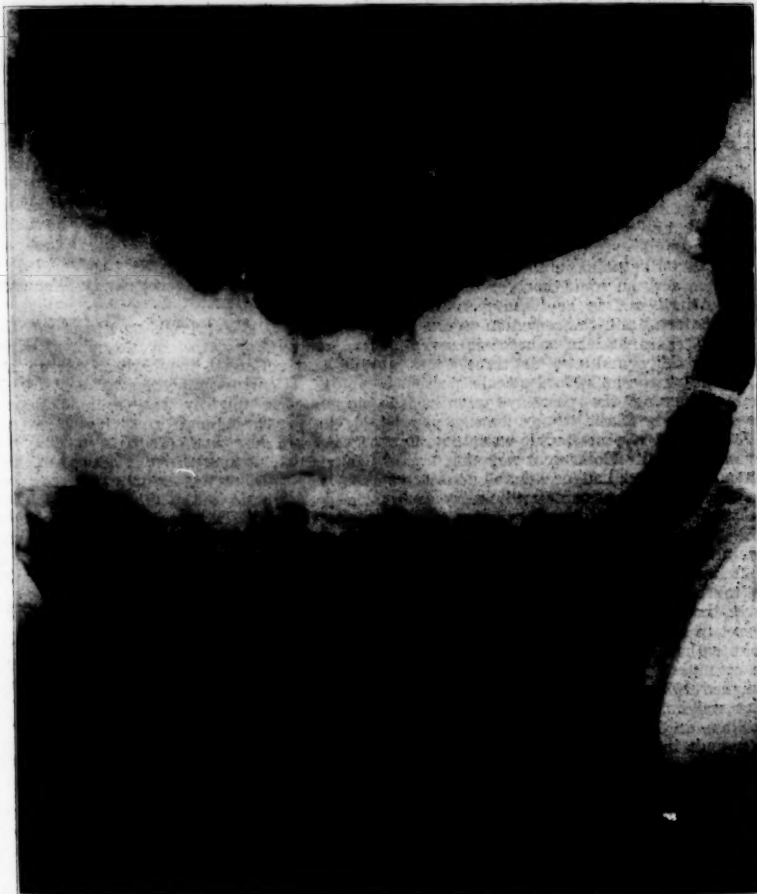
The patient had marked urgency to defecate many times in the day without result. He had pain with movements or cramps previous to movements radiating to the groin, scrotum and rectum. September 21 he had cramp-like pain in the lower abdomen all the evening, with rather frequent soft movements. There was slight rise in temperature (101°) with a red throat and increase in respiration. September 23 his slight respiratory infection had disappeared.

September 25 operation was done. Next day the temperature was 100.5°-101.1°, the pulse 100-120. September 27 the abdomen was soft but considerably distended. The patient vomited that day. He was relieved by a stomach wash. The stomach was markedly dilated and full of black-brown fluid. He had some pelvic sepsis, no general peritonitis. The urine showed rare red cells, many leucocytes, sp. gr. 1.020. September 28 a medical consultant reported, "Very marked sweating. Skin very cold and clammy. Pulse 120. Lungs clear. Heart sounds rapid, regular and distant. Abdomen in good condition. Systolic B. P. 65,

diastolic not obtained. I think the patient should be treated energetically as for shock,—hot water bottles, intravenous saline now and blood transfusion if salt does not bring him back. He needs a little morphia now." The temperature rose to 102.2°, the pulse to 145. September 29 the patient died.

and the man who wrote the history said five years ago.

I do not know whether the record means that he had never used soda or that he had used it and it had not benefited him. The reason I comment on it is because it is of interest to know, in these digestive cases, whether the patient was



Barium enema. Shows an irregular filling defect in the sigmoid with partial obstruction of the barium at this point.

DISCUSSION

BY DR. EDWARD L. YOUNG, JR.

Apparently the patient and the man who wrote this history had different ideas as to when this present illness began. The patient said it began eight months ago with cramp-like pains,

accustomed to take soda, and with what result.

There are two or three things to speak of aside from the general picture, which is very suggestive: (1) the statement we reiterate so often, that any change in the normal bowel habits of any one over fifty ought to be the subject of investigation; (2) the fallacy of taking

as final the report of any X-ray. I do not know that that was done here, but the record suggests that it was done by the patient at least. X-ray is of course the greatest single bit of evidence we have in a good many conditions, in stomach and duodenal lesions and trouble in the large bowel. But it is not final, and to give out that there is negative or even positive evidence of trouble in either place, unless the positive is very definite of course, is wrong, and any physician should be very careful in accepting it, particularly when the evidence given out is against the clinical evidence such as we have here in the story. As we get this story it sounds to us so definite of organic trouble in the gastro-intestinal tract that as we look back on it it seems as though it must have been more evident four months ago or even longer.

On the story alone it is not clear where it is. At first we wonder whether it is trouble in the stomach, but as time goes on the alternating constipation and diarrhea, the mucus and blood in the stools, certainly point more toward trouble in the large intestine. And I think it is always a question whether in the face of symptoms like these we should not pay attention to the clinical evidence even though a competent X-ray man has said he can find nothing. Because certainly the persistence of symptoms such as this is very definite.

I suppose the record means that he had the appearance of the chest which in previous years used to be considered evidence of emphysema but which apparently does not go with the signs.

This X-ray appearance fits in so definitely with what we have been reading in the history that it would seem to make the diagnosis for us even though the conclusions are withheld.

In view of the fact that we have a pretty definite bit of evidence coinciding with the clinical evidence of trouble in the sigmoid, it is worth while to emphasize that trouble "somewhere" in the gastro-intestinal tract can cause symptoms pointing almost anywhere in the tract early in the game. That is, trouble in the stomach can cause constipation and symptoms apparently pointing toward the lower bowel, and trouble in the lower bowel can cause indigestion and distress at times suggesting trouble higher up.

It seems to me that we cannot make any diagnosis other than carcinoma of the sigmoid. Operation would be an abdominal operation first to see whether or not there were metastases, then to see whether a radical resection could be done; preferably in one stage; in two if it seemed to be too big a bite for one operation.

DR. YOUNG'S PRE-OPERATIVE DIAGNOSIS

Carcinoma of the sigmoid.

PRE-OPERATIVE DIAGNOSIS

Carcinoma of the sigmoid.

Diverticulitis.

Gas and ether. A splitting incision. A found throughout the w particularly large appendic whole of the sigmoid and the rectosigmoid junction w parently carcinoma with in what enlarged glands in the liver showed no evidence of m area about six inches long with ing fat and glands was removed, being cut through with actual cautelated. A large rubber tube was inserted distal to the bowel segment through the rectum, and a suture then the sigmoid to the rectum. The tube w sutured to the gut and the proximal port the bowel invaginated into the distal for tance of three inches. Although as much as possible had been removed previous to suture there was still a great deal of fat t draw together over the bowel. The omentum was then pulled down about the suture line and two cigarette drains placed on either side of the gut. The abdominal wound was sutured. Between the fascia and the skin three short rubber dam wicks were placed emerging between the skin stitches.

PATHOLOGICAL REPORT

A section of large intestine 10 cm. long. On section the mucosa shows an annular growth encircling the lumen, 7 cm. in length, having a fine polypoid-like surface. No glands could be found in the mesenteric fat.

Microscopical examination shows irregular gland tubules composed of atypical columnar epithelial cells invading the muscular walls.

Adenocarcinoma.

FURTHER DISCUSSION

They thought there was diverticulitis. I do not see in the X-ray anything to make us think that. Of course it is true that carcinoma of the sigmoid develops often on the basis of an old diverticulitis. But the barium enema will as a rule show the diverticula fairly plainly.

In the X-ray plate of the chest they did not find much. In the second plate there is a filling defect, almost complete, in the sigmoid. Is there anything here suggestive of diverticulitis?

DR. JOHN D. CAMP: I think sometimes with a diverticulitis or peridiverticulitis we might get a picture similar to that, but I should think you would get some evidence of the presence of diverticula above the localized filling defect seen here.

DR. YOUNG: It is pretty rare to have it as definitely localized as that was and not to show anything more.

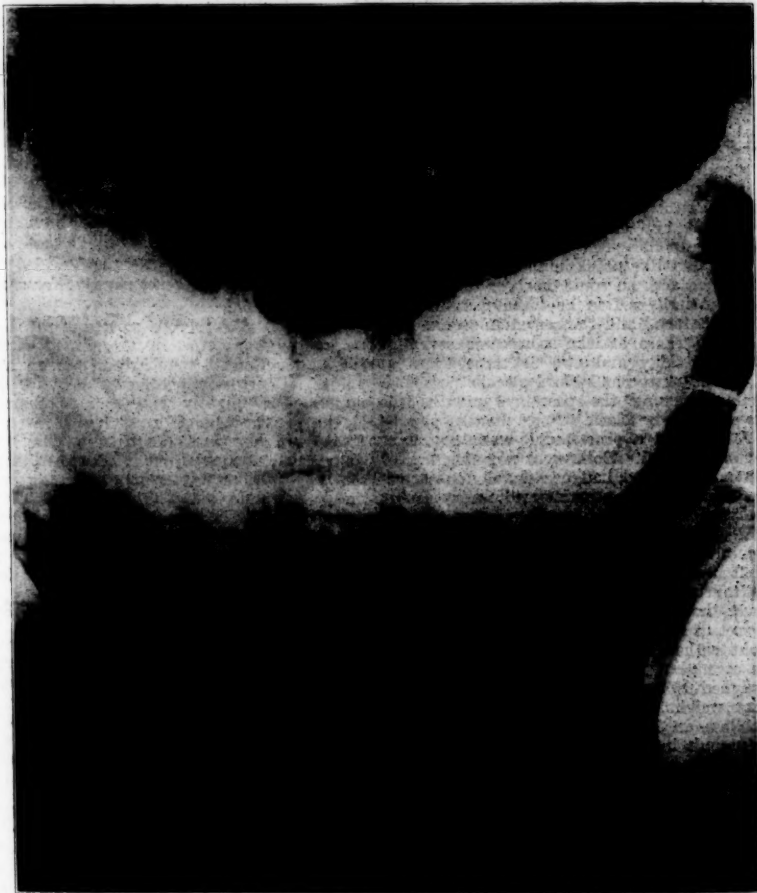
Perhaps they should not have stated "no general peritonitis" quite so dogmatically. I

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diastolic not obtained. I think the patient should be treated energetically as for shock,—hot water bottles, intravenous saline now and blood transfusion if salt does not bring him back. He needs a little morphia now." The temperature rose to 102.2°, the pulse to 145. September 29 the patient died.

and the man who wrote the history said five years ago.

I do not know whether the record means that he had never used soda or that he had used it and it had not benefited him. The reason I comment on it is because it is of interest to know, in these digestive cases, whether the patient was



Barium enema. Shows an irregular filling defect in the sigmoid with partial obstruction of the barium at this point.

DISCUSSION

BY DR. EDWARD L. YOUNG, JR.

Apparently the patient and the man who wrote this history had different ideas as to when this present illness began. The patient said it began eight months ago with cramp-like pains,

accustomed to take soda, and with what result.

There are two or three things to speak of aside from the general picture, which is very suggestive: (1) the statement we reiterate so often, that any change in the normal bowel habits of any one over fifty ought to be the subject of investigation; (2) the fallacy of taking

as final the report of any X-ray. I do not know that that was done here, but the record suggests that it was done by the patient at least. X-ray is of course the greatest single bit of evidence we have in a good many conditions, in stomach and duodenal lesions and trouble in the large bowel. But it is not final, and to give out that there is negative or even positive evidence of trouble in either place, unless the positive is very definite of course, is wrong, and any physician should be very careful in accepting it, particularly when the evidence given out is against the clinical evidence such as we have here in the story. As we get this story it sounds to us so definite of organic trouble in the gastro-intestinal tract that as we look back on it it seems as though it must have been more evident four months ago or even longer.

On the story alone it is not clear where it is. At first we wonder whether it is trouble in the stomach, but as time goes on the alternating constipation and diarrhea, the mucus and blood in the stools, certainly point more toward trouble in the large intestine. And I think it is always a question whether in the face of symptoms like these we should not pay attention to the clinical evidence even though a competent X-ray man has said he can find nothing. Because certainly the persistence of symptoms such as this is very definite.

I suppose the record means that he had the appearance of the chest which in previous years used to be considered evidence of emphysema but which apparently does not go with the signs.

This X-ray appearance fits in so definitely with what we have been reading in the history that it would seem to make the diagnosis for us even though the conclusions are withheld.

In view of the fact that we have a pretty definite bit of evidence coinciding with the clinical evidence of trouble in the sigmoid, it is worth while to emphasize that trouble "somewhere" in the gastro-intestinal tract can cause symptoms pointing almost anywhere in the tract early in the game. That is, trouble in the stomach can cause constipation and symptoms apparently pointing toward the lower bowel, and trouble in the lower bowel can cause indigestion and distress at times suggesting trouble higher up.

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DR. YOUNG'S PRE-OPERATIVE DIAGNOSIS

Carcinoma of the sigmoid.

PRE-OPERATIVE DIAGNOSIS

Carcinoma of the sigmoid.

Diverticulitis.

OPERATION

Gas and ether. Left suprapubic rectus splitting incision. A great deal of fat was found throughout the whole abdomen and particularly large appendices epiploicae on the whole of the sigmoid and upper rectum. At the rectosigmoid junction was a large mass, apparently carcinoma with infection, and somewhat enlarged glands in the mesorectum. The liver showed no evidence of metastasis. An area about six inches long with the surrounding fat and glands was removed, the sigmoid being cut through with actual cautery and isolated. A large rubber tube was inserted downward distal to the bowel segment and out through the rectum, and a suture then made of the sigmoid to the rectum. The tube was then sutured to the gut and the proximal portion of the bowel invaginated into the distal for a distance of three inches. Although as much fat as possible had been removed previous to the suture there was still a great deal of fat to draw together over the bowel. The omentum was then pulled down about the suture line and two cigarette drains placed on either side of the gut. The abdominal wound was sutured. Between the fascia and the skin three short rubber dam wicks were placed emerging between the skin stitches.

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DR. YOUNG: It is pretty rare to have it as definitely localized as that was and not to show anything more.

Perhaps they should not have stated "no general peritonitis" quite so dogmatically. I

should like to be almost as dogmatic as they were, and say he died of general peritonitis, the evidence in the lowered blood pressure and shock-like symptoms due to the toxic products of sepsis. I do not know what else to say it is. It seems a pretty long cry to say shock four days after operation, and certainly there has to be something to cause this. Dr. Richardson has educated us to the recognition of the fact that the majority of these cases do die of sepsis, and although there is no slightest evidence other than the general symptoms I think that is the best bet.

X-RAY INTERPRETATION

Findings are probably due to malignant disease of the sigmoid.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Carcinoma of the sigmoid colon.
Dilatation of the stomach.
Resection of sigmoid colon.

DR. EDWARD L. YOUNG'S DIAGNOSIS

Carcinoma of the sigmoid colon.
General peritonitis.

ANATOMICAL DIAGNOSIS

1. *Primary fatal lesion*
(Adenocarcinoma of the sigmoid colon.)
2. *Secondary or terminal lesions*
Necrosis of sigmoid flexure, lower part.
Focal fatty metamorphosis of the liver.
3. *Historical landmarks*
Resection of colon for carcinoma.
Nephrolithiasis.

DR. RICHARDSON: Examination in this case was made through the wound of operation. As far as the notes go no definite peritonitis was made out. There was some necrosis of the sigmoid flexure in the region of the operation wound, but the note further says that the suturing there appeared to be intact.

No evidences of metastases were found. The stomach seemed to be all right, a little large. There were numerous stones in the gall-bladder. The bile-ducts, pancreas, kidneys were negative. The chest was not examined. In the pelvis of each kidney there was a small stone.

DR. YOUNG: Were the kidneys perfectly good grossly? The stone had not caused obstruction?

DR. RICHARDSON: Apparently not.

DR. CABOT: Cancer was the main cause of death?

DR. RICHARDSON: It is hard to say, the examination was so restricted.

DR. YOUNG: It is interesting because pelvic operations of course have surprisingly little shock to them compared with operation higher

in the abdomen. I do not think we really know just why he did go to pieces this way, unless he did not have even strength to swing an operation of this size.

CURRENT LITERATURE

ABSTRACTORS

GERARDO M. BALBONI	TRACT MALLORY
WILLIAM B. BREED	HERMAN A. OSGOOD
LAURENCE D. CHAPIN	FRANCIS W. PALFREY
AUSTIN W. CHEEVER	EDWARD H. RISLEY
RANDALL CLIFFORD	GEORGE C. SHATTUCK
ERNEST M. DALAND	WILLIAM H. SHEDDEN
HORACE GRAY	WARREN R. SISBON
ROBERT M. GREEN	JOHN B. SWIFT, JR.
JOHN B. HAWES, 2ND	GEORGE G. SMITH
JOHN S. HODGSON	W. T. SHERMAN THORNDIKE
FRED S. HOPKINS	WILDER TILESTON
CHESTER M. JONES	HENRY R. VIETS
CHARLES D. LAWRENCE	SHIELDS WARREN
	BRYANT D. WETHERELL

PREVENTION OF POSTOPERATIVE HERNIA

WATSON, LEIGH F. (*Northwest Medicine*, April, 1924).

A muscle-splitting incision should be used when possible. In long incisions muscle fibers must not be sacrificed needlessly, and the motor nerves must be saved. The fascia is the strongest structure in the abdominal wall and it is very essential to close it properly. It is frequently under tension and unites more slowly than muscle tissue; for this reason it is necessary to overlap each layer separately. When closure under tension is unavoidable the patient's shoulders should be kept in a semi-reclining position and the knees elevated on pillows (the "jack-knife" position) for a week after operation. Tension or stay-sutures are valuable to prevent strain on the fascia stitches. A gain in weight after operation, especially in obese subjects, should be avoided because it increases intra-abdominal tension and weakens the abdominal wall. The use of an elastic belt checks the tendency to rapid accumulation of fat.

BLADDER INJURY DURING HERNIA OPERATIONS

WATSON, LEIGH F. (*American Journal of Surgery*, April, 1924).

Large, irreducible, or strangulated hernias often present unusual difficulties, sometimes taxing the skill of the most experienced operators. The danger lies in accidental injury to the bladder, intestine, blood vessels or vas deferens. The bladder is involved in about one per cent. of all inguinal hernias in adults. In certain cases it is only by a most careful examination of the sac that bladder injury can be avoided. Bladder wall should be suspected when the sac is thick, when it is covered by a quantity of lemon-colored properitoneal fat, or when there are numerous blood vessels on its surface. When the bladder is in the sac wall it is nearly always on the inner side, and for this reason the sac should always be opened at a thin white point on the outer side.

CALCIUM CASTS IN YELLOW FEVER

HOFFMANN, of Havana, reports (*Münch. med. Woch.*, July 4, 1924) his observations of the kidneys in yellow fever. He found calcium casts present in 24 out of 28 human cases; and in dogs, but not in guinea-pigs, artificially infected with *Leptospira icteroides*. He believes this finding is of diagnostic value.

[R. M. G.]

RESULTS OF SURGERY AND OF SURGERY COMBINED WITH
ROENTGEN-RAY TREATMENT IN EXOPHTHALMIC GOITER

RICHARDSON, E. P. and MEANS, J. H. (*Archives of Surgery*, September, 1924).

These authors report on the work done at the Massachusetts General Hospital. They state that, in regard to the technical difficulty of the operation itself, it is their opinion that the cases treated by X-ray show no noteworthy increase in operative difficulty and that, therefore, one need not consider this aspect of the situation in relation to the use of X-ray. They carefully analyze and group their series of cases, presenting many interesting charts and tables, and draw the following general conclusions:

1. The patient's general condition following ligation of the superior thyroid arteries, rather than the metabolic rate, should be the guide to the time of further operation.

2. Ligation of the superior thyroid arteries appears to be slightly more effective in patients having previously had roentgen-ray treatment.

3. We have no evidence as yet that the effectiveness of roentgen-ray treatment is increased by previous ligation of the superior thyroid arteries.

4. The degree of benefit received from hemithyroidectomy is not increased by previous roentgen-ray treatment.

5. Hemithyroidectomy, although occasionally curative, is not a desirable step in the surgical treatment of exophthalmic goiter. It should be followed as a rule by completion of the operation of subtotal thyroidectomy within a few months.

6. We have no reason to believe that myxedema is more likely to occur following subtotal thyroidectomy in patients who have undergone roentgen-ray treatment than in those who have not.

7. The effect produced by surgery in the treatment of exophthalmic goiter appears little modified by previous roentgen-ray treatment.

[E. H. R.]

RECONSTRUCTIVE SURGERY OF THE HAND

BUNNELL, S. (*Surgery, Gynecology and Obstetrics*, September, 1924).

This author presents a most excellent article on this important subject, profusely illustrated with accurate charts and photographs of results accomplished. He is most minute in his detail description and lays down some very important first principles upon which success depends. He states emphatically that joints must be mobilized before tendons are repaired or no motion will result. We cannot expect a newly repaired tendon to move a stiff joint. We should not repair a bone and at the same time a tendon or joint. The former demands postoperative immobilization, and the latter mobilization. The article is of extreme value.

[E. H. R.]

CHOLECYSTOGASTROSTOMY AND CHOLECYSTODUENOSTOMY

DUBOSE, F. G. (*Surgery, Gynecology and Obstetrics*, September, 1924).

This author, while not advocating these two operations as to replace cholecystostomy and cholecystectomy, shows their definite advantages in certain definite cases and gives in detail the technique. The article is well illustrated.

[E. H. R.]

INCARCERATED HERNIA INTO THE UMBILICAL CORD

FOWELIN and BODE, of Riga, report (*Munch. med. Woch.*, August 29, 1924) a case of incarcerated hernia into the umbilical cord cured by radical operation nine hours post partum.

[R. M. G.]

INFECTIONS OF THE HAND

GARLOCK, J. H. (*Surgery, Gynecology and Obstetrics*, August, 1924).

This author writes a very interesting, concise, and readable article of 26 pages on this extremely important subject, and draws the following conclusions:

1. The vast majority of simple abscesses of the hand are, as a rule, easily recognized and may be treated adequately. The occasional case of abscess over the site of a clearly defined anatomical synovial compartment or fascial space often offers considerable difficulty in differential diagnosis. Recognition of the importance of minor signs would seem to tend to overcome this difficulty.

2. Localized cellulitis of the digits and hand often simulates closely the more severe infections of the tendon sheaths or fascial spaces. As conservative treatment practically always results in a cure and as unnecessary incisions usually aggravate the conditions present, it becomes imperative to study most carefully the various symptoms and objective findings in each individual case so that a positive diagnosis may be arrived at.

3. Isolated abscess of the web spaces is not an infrequent form of hand infection. The physical signs are distinctive and, to secure adequate drainage, the web may be split from front to back, for no untoward sequelae followed this procedure.

4. The successful treatment of collar-button abscess depends mainly upon the recognition and isolation of the tiny sinus connecting the superficial and deep pockets. The latter is very often the more extensive of the two. The results in this group are most satisfactory, two out of the 42 in this series presenting slight permanent anatomical defects.

5. Paronychia is probably more often unilateral than total. It is better apparently to treat these early infections radically than to await the more evident typical "run around." It is important to remember that, in the majority of instances (28 out of 42 cases here), the subungual region adjacent to the infected paronychium is also involved, requiring removal of the side and corner of the nail to secure proper drainage. The chronic cases, with fungus-like granulations extending from beneath the eponychium, yield to the radical operation or a Bier's hyperemia for a short while.

6. Carbuncles are found on the dorsum of the hand and fingers, the pathology depending upon the anatomical peculiarities of the skin in this region. The successful treatment of this form of infection calls for the early recognition of the extent of pathology present and wide radical incisions with undermining of the skin flaps.

7. Felons may be either well localized, involving only a part of the anterior closed space, or they may affect the entire space. The proportion in this series was 25 to 27 cases. Diagnosis usually offers very little difficulty. In the treatment, the important factors are the time for incising and the anatomical position of the incision. It would appear that the side incision offers the best chance for a symptomatic cure. Where a discharge continues after satisfactory drainage, the cause is usually to be found in an osteomyelitis of some part or whole of the distal phalanx. Twenty-one of a total 62 cases presented this complication. Depending upon the extent of involvement, recovery results with conservatism in the mild cases and removal of the necrosed portion in the more extensive ones. With the epiphysis untouched, regeneration of at least part of the diaphysis occurs more often than is generally realized. The reconstruction of deformed tender scars constitutes another phase of the later treatment.

8. Suppurative tenosynovitis of the flexor tendon sheaths should be considered a major surgical condition. In its successful treatment the ingenuity

and patience of the surgeon are frequently taxed to the utmost. When the subject is carefully analyzed, it appears that, until our knowledge of the anatomy, physiology and pathology of the tendons and their sheaths is more perfect, the best end-results can be obtained by (a) an early diagnosis made possible by proper evaluation of physical signs; (b) early operation, preferably during the first 24 hours; (c) performing the operation in a bloodless field with the patient under general anesthesia; (d) the use of properly placed and sufficiently long primary incisions; (e) making every attempt to avoid secondary contamination and infection during the post-operative period; (f) reducing the use of drainage material to a minimum; (g) the early employment of active and passive motion and, later, of other physio-therapeutic remedies and devices; and (h) maintaining an attitude of constant close attention to details until treatment has been terminated.

9. Suppurative ulnar bursitis follows either a tenosynovitis of the little finger or an extension from the radial bursa, the latter occurring in 33.3 per cent. of the cases in this series. Diagnosis is not difficult when the history and previous pathology are known and when the various objective findings are carefully evaluated. The treatment calls for properly placed adequate incisions both in the hand and above the wrist and the application of the same principles outlined under suppurative tenosynovitis. To secure free drainage in particularly virulent cases, the anterior annular ligament may be split. No untoward results followed this procedure. When the infection extends beyond this sac, in the hand the middle palmar space or the radial bursa or both become infected, and in the forearm the deep spaces become involved. Great difficulty is experienced in attempting to analyze end-results because of their direct bearing on the outcome of the infection in associated anatomical regions.

10. The observations recorded above apply equally as well to suppurative radial bursitis. Radial bursitis frequently follows traumatic amputations of the thumb. In making the incision, every effort should be made to avoid injuring the intrinsic muscles of the thumb so that the important apposing action may be preserved. It is rarely, if ever, necessary to split the annular ligament for the upper end of the bursa can be thoroughly drained through the external lateral incision above the wrist.

11. Thenar space infection is a most characteristic entity. The predominant diagnostic feature is the excessive ballooning out of the thenar eminence. Accepting the anatomical outline and limits of this space, treatment consists mainly in making the incision advocated by Kanavel. A complete restoration of function can be expected in every uncomplicated case.

12. The diagnosis of infections of the mid-palmar space should rarely offer any great difficulty. The outstanding single objective finding is the replacement of the normal concavity of the palm by a convexity. Bearing in mind the anatomical boundaries and position of this space, the reason for using the incision recommended becomes apparent. In the great majority of uncomplicated cases there is every reason to expect an excellent end-result—80 per cent. in this series. In other cases, the final outcome appears to be influenced by infections present in adjacent tendon sheaths and bursae.

13. The important facts determined by an analysis of the deep forearm abscesses were (a) that they were caused by extension from a preëxisting radial or ulnar bursa infection; (b) that the pus was situated deep to the flexor tendons; (c) that satisfactory drainage could be obtained only by the side incisions; and (d) that the final results were generally satisfactory.

14. Suppurative tenosynovitis of the common extensor tendon sheath is an uncommon condition. While not pathognomonic, the outstanding signs and

symptoms are inability to flex the fingers and the absence of positive findings on the anterior aspect of the hand. Simple splitting of the sheath seems to form the basis of treatment. It is interesting to note that necrosis of the extensor tendons occurs rarely. The number of good later results is thereby greatly increased.

15. Osteomyelitis of the proximal or middle phalanges usually follows incompletely drained flexor tenosynovitis. The proximal interphalangeal joint is very often also involved. The course of treatment followed will depend upon the extent of the disease, various cosmetic and economic factors, and the progress of associated infections, and will range from simple conservatism to amputation.

16. Infection of the palmar fascia is a rare condition, evidencing definite pathological findings and caused usually by the staphylococcus aureus. Treatment is simple and consists of incision with removal of the necrosed fascia. The results are good.

17. Phlegmonous lymphangitis is a severe lymphatic infection on the dorsum of the hand, forearm and often the arm, accompanied by necrosis of the subcutaneous tissues, superficial fascia and, sometimes, large areas of skin. Marked systemic symptoms manifest themselves and are often severe enough to overwhelm the patient. Adequate drainage through multiple incisions, maintenance of the fluid level of the body, the use of the Carrel-Dakin technique, and transfusions are the main factors in treatment.

18. The intelligent treatment of hand infections demands a knowledge of the anatomy of the hand and the various pathological processes that may exist. Every effort should be made to obtain the best result possible, for the hand, from the economic, social and cosmetic standpoints, is one of the most important organs of the human body.

[E. H. R.]

SHAKESPEARE AND SYPHILIS

In the same issue of the *Annals of Medical History*, DR. PACKARD, the editor, collates an interesting series of references in Shakespeare's plays to syphilis and its manifestations. Hardly one of the plays does not contain some allusion of this sort, but they are particularly numerous in "Timon of Athens."

[R. M. G.]

ETIOLOGY OF ANAPHYLACTIC DISEASES

HAJOS, from Koranyi's third medical clinic at Budapest, reports (*Wien. klin. Woch.*, June 12, 1924) a series of cases of bronchial asthma, urticaria, and migraine as contributions to the etiology of the anaphylactic diseases. All are characterized by eosinophilia ranging from 6 to 9 per cent.

[R. M. G.]

DR. BUTTES AND SHAKESPEARE

In the *Annals of Medical History* for June, 1924, DR. TOOMEY of St. Louis has entertainingly resurrected the true history of Sir William Buttes of Norfolk, the physician of Henry VIII mentioned by Shakespeare. Born in Norwich, he received his education at Gonville College, Cambridge, and practised at first in that city, but removed to London after his appointment as court physician. Not only the royal family but many of the nobility were numbered among his patients; and he enjoyed the name of Dr. Buttes throughout his life. Under the name of Dr. Buttes, Shakespeare presents him in "The Famous History of the Life of King Henry VIII" as calling his monarch's attention effectively to the ignominy with which Cranmer had been treated by the lords of the council.

[R. M. G.]

STUDIES IN EXHAUSTION: VII. AUTOINTOXICATION

CRILE, G. W. (*Archives of Surgery*, September, 1924).

Crile presents a considerable series of experiments in relation to this subject and, after giving a general summary, states in conclusion that these studies make it appear that the primary cause of exhaustion from autointoxication is identical with that of exhaustion from other causes, i. e., the primary cause of the general exhaustion of the organism in auto-intoxication is exhaustion of the central nervous system, especially the brain. He shows numerous plates of pathological tissue to confirm these results.

[E. H. R.]

CONGENITAL HYDRONEPHROSIS

HAHN, E. V. (*Archives of Surgery*, September, 1924).

This author presents a review of the literature, with a report of two cases, and draws the following general conclusions:

1. In 15,800 admissions to the Robert W. Long Hospital, there were two cases of congenital hydronephrosis.

2. Congenital hydronephrosis may be defined as a dilatation of the renal pelvis with fluid, occurring early in life, and without a demonstrable or probable cause arising postnatally.

3. Cohnheim's dictum that sudden, complete obstruction of the ureter causes primary atrophy and not hydronephrosis of the corresponding kidney is accepted without question in many textbooks and papers.

4. The published results of ureteral obstruction in experimental animals are in sharp disagreement.

5. Variations in capsular anastomotic blood supply have been suggested as the cause of variable results of ureteral obstruction. Experimental work purporting to disprove this explanation has not (to my knowledge) been confirmed.

6. It is suggested that differences in results of ureteral obstruction may be due to the age of the animal; incidence of infection; degree of venous obstruction, and the method and site of obstruction.

7. The theory that muscular insufficiency causes hydronephrosis is unsupported by convincing evidence.

8. Congenital absence of a ureter cannot be a cause of hydronephrosis.

9. Abnormal renal mobility, anomalies of the blood vessels, obliquity of ureteral insertion, and the presence of accessory ureters have all been proposed as etiologic factors in hydronephrosis, but are inadequately supported by convincing evidence.

10. The normal stenosis of the ureter is described, and the development of our knowledge of it is reviewed. Persistence of fetal irregularities has been neither proved nor disproved as a cause of congenital hydronephrosis.

11. Mechanical irritation and infection have been advanced as causes of acquired ureteral stricture. The frequent occurrence of secondary infection in hydronephrotic kidneys obscures the etiologic significance of evidence of infection when it is observed in specimens.

12. In Case 1, no vestige of a ureter could be found. The low specific gravity and high coagulable protein content of the fluid in the sac make it probable that the fluid was more a transudate than urine. Its accumulation in the sac is ascribed to an edema-producing mechanism, partly osmotic and partly due to venous obstruction.

13. In Case 2, no anomalies of position or blood supply were found to explain the hydronephrosis. The ureter showed a marked stenosis immediately below the ureteropelvic junction. It is believed that

the few infiltrating cells and fibrosis of the submucosa do not prove that the lesion was inflammatory in origin.

[E. H. R.]

PSIKAIN AS AN ANESTHETIC

WILLSTÄTTER, GÖTTLIEB, BRODT, KÜMMEL, VOELCKER, BERINGER and WILMANNs of Heidelberg present (*Munch. med. Woch.*, June 27, 1924) a symposium on psikain as a local anesthetic, discussing its synthesis, pharmacology, clinical action, and comparing it with cocaine. It is particularly effective on mucous membranes.

[R. M. G.]

DIAGNOSIS OF SPINAL METASTASIS

SCHOLZ, of New York, presents (*Munch. med. Woch.*, August 1, 1924) a scheme for the Röntgen diagnosis of spinal metastasis in cases of neoplasm with clinically latent primary focus inside the thorax. He records a series of four cases.

[R. M. G.]

ALIMENTARY LEUCOPENIA IN UTERINE CARCINOMA

SIMON, from Döderlein's clinic at München, presents (*Munch. med. Woch.*, August 15, 1924) a study of alimentary leucopenia in uterine carcinoma, as a contribution to cancer diagnosis. He reports a series of 29 cases, and believes his observations are of diagnostic value.

[R. M. G.]

REACTION OF BONE TO VARIOUS METALS

ZIEROLD, A. A. (*Archives of Surgery*, September, 1924).

This author presents an extensive experimental study on this subject and draws the following conclusions:

"Gold, aluminum and stellite are readily tolerated by bone and tend to become encapsulated with but little hindrance to the reparative processes. They are inert materials, unaffected by the living cells and body fluids. This is contrary to the findings of Duval, Elsberg and Danborn, who observed that aluminum was absorbed when planted in the tissues.

"Silver and lead are only slightly less tolerable to bone, but are easily corroded and evoke a slightly greater connective tissue response.

"Zinc goes into solution readily and causes a slight connective tissue stimulation. It also interferes with bone regeneration and does not become encapsulated by it.

"Contrary to Grove's findings, nickel has a distinctly injurious effect on bone growth. It is soluble in the tissue, which makes little attempt to retain it.

"Also opposed to Grove's observations are those regarding magnesium. In the experiments before mentioned, its behavior proves that it has little action other than as a connective tissue stimulant. If anything, it retards rather than accelerates bone production.

"Copper causes definite stimulation to bone production, although being slowly absorbed. Some specimens suggest that it may be toxic to the tissue in the immediate vicinity, but an active stimulant at a distance.

"Alloying copper and aluminum seems to perpetuate this toxic action, but without its far-reaching irritant effect, for copper aluminum bronze frankly interferes with bone regeneration and tends to become extruded.

"Steel and, to a less degree, iron definitely inhibit bone regeneration. Steel, which is poorly tolerated and readily soluble, seems least suitable of all for bone prosthesis."

[E. H. R.]

THE BOSTON Medical and Surgical Journal

Established in 1828

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THE END OF THE SPECTRUM

THE value of the ultra violet invisible end of the spectrum, with a wave length of approximately 2000 Angstrom units, has long been suspected in medical therapeutics, and now seems to be definitely established. Hess, Park, Hoag and others have demonstrated its efficacy in the treatment and prevention of rickets and tetany. Rollier has been its most famous exponent in the treatment of tuberculosis, various observers have claimed unique results from its employment in certain skin conditions, and as is usual with any new and spectacular therapeutic agent, it has been utilized in treating a variety of diseases from asthma to pelvic peritonitis with results that would be indeed startling if they could always be corroborated.

The most generally available as well as the least expensive source of ultra violet light comes from the actinic ray of the sun, and at Alpine heights where atmospheric obstruction is at a minimum. Rollier has met with deserved success in its employment in the treatment of tuberculosis. The sanatorium conducted by Lo Grosso at Perysburg, New York, has also afforded a convincing demonstration of its value in this country. In all discussions of the merits of the invisible ultra violet ray, however, it must be re-

membered that it cannot permeate ordinary glass; exposure, to be effective, must be direct.

In the temperate zone and on the Atlantic seaboard the availability of the natural solar source of the ultra violet ray is at a minimum. During our winters particularly when the sun's rays come always at an angle a greater degree of light-absorbing atmosphere must be penetrated than at Alpine altitudes. The proportion of cloudy days is greater and climatic conditions often prohibit the desirable direct body exposure. To these facts must be attributed, at least in part, our greater incidence of tuberculosis and of rickets. Mankind in this zone is deprived of its most valuable germicidal agent and its most powerful hygienic factors.

It has been shown that an intense ultra violet ray is generated by the mercury vapor lamp, and that this ray may be made available by the institution of transparent quartz for glass in the lamp. Such lamps have been in use for a number of years and their value has been clearly shown, even if we fail to accept the claims of some enthusiasts that their efficiency is greater than that of the sun itself. Whatever their virtue may be it depends on the use of transparent quartz as a light transmitting substance, and despite the fact that a large part of the earth is composed of quartz in some form or other, this has been expensive and difficult to obtain in a practical form.

Recent experiments of the General Electric Company have shown, however, that fused quartz may be produced in a practical form, and such are the remarkable qualities of this mineral that the world may well be about to enter the Age of Quartz. Fused quartz is now produced under great pressure in the electric furnace at its melting point of about 4000 degrees Fahrenheit; at this temperature it assumes the consistency of molasses in cold weather. Bubbles are largely eliminated, first by vacuum and then by the pressure obtained. Fused quartz is harder than platinum, with one-seventeenth of its coefficient of expansion. It retains its size and shape under repeated heating and cooling better than any other known substance. It is an almost perfect insulation. It may be heated above the melting point of gold and plunged into cold water without damage to itself. It is almost three times as transparent as glass, and is practically 100 per cent transparent to the ultra violet ray, transmitting the entire spectral range from the shortest ultra violet ray to the longest infra-red, or heat ray. It naturally tends to form such a smooth reflecting surface that the spectral rays escape from it only with the greatest difficulty, hence light or heat applied to one end of a tortuous rod will be emitted from the other end, almost without loss. One end of such a rod may be placed in a fire and the opposite end will emit the heat while the shaft remains cool.

The possibilities of such a mineral in therapeutic medicine can be imagined, and they depend largely on this power of transmitting the life-protecting ultra violet ray. The time may yet come when hospital solaria will be glassed with quartz windows or illuminated with quartz light bulbs. Inaccessible parts of the body may be irradiated by properly shaped tubes. Now that the means are at hand, new and more surprising uses for this substance will undoubtedly be discovered.

DENTAL CARIES

To the average medical man, a bad tooth is a bad tooth. He does not have to distinguish between the teeth with soft or discolored areas of hypoplasia, the teeth worn down by attrition or abrasion, the chemically eroded teeth and those truly carious. Although he can and does hand over this problem to the dentist, it is of no little value to compare notes occasionally and see what has been accomplished.

The enamel of the teeth is shown by histologic study to be composed of enamel rods joined by a cement substance. This cement is somewhat soluble in acid and when dissolved the enamel rods become loosened and a cavity forms. Once through the enamel, much more rapid destruction occurs and bacteria invade the dentin, growing in the dentin tubules and destroying the matrix by decalcification and subsequent putrefaction. Unless there is operative intervention, infection of the pulp soon follows.

There is no one organism which can be blamed for dental caries. The commonest seems to be the *Bacillus acidophilus*, so frequently administered in intestinal disorders, or a related form. It is able to produce and resist a high concentration of acid on the tooth surface, although its presence in perfectly healthy mouths means other factors must come into play.

As is to be expected, the ductless glands have come in for a share of blame, although the only definite evidence is slight deficiency in calcification after parathyroidectomy and some clinical observations of rapid tooth decay in cases of hyperthyroidism.

The buffer action of the saliva is apparently of importance in neutralizing the acids produced by the various bacteria. Several sets of experiments show that this buffer action or neutralizing power may increase considerably when saliva is obtained by stimulation of the salivary glands, as by chewing paraffin. This increase has been found to be much less in cases with caries than in those with sound teeth.

McCollum and his co-workers have succeeded in producing caries-like lesions, pulp exposure, fracture and overgrowth of the teeth by various dietary changes. Although the evidences of the

disease are entirely out of proportion to the extent of any food deficiency and it is not possible to blame dental disease on any one specific dietary deficiency, they seem justified in their conclusion that "any slight variation in the American diet, which always so dangerously approaches the level of dietary deficiency, might become active at any period of lowered resistance or of physical or nervous stress."

A MEDICAL CENTER

ON Thursday, November 20, a group of men representing the medical schools, hospitals, medical societies, health organizations and the Medical Library met in Sprague Hall at the Library and discussed the advisability of developing a medical center with the Medical Library as its central coordinating agency.

The subject was discussed from many angles and a temporary organization was created consisting of Dr. W. P. Bowers, temporary chairman, and Dr. Channing Frothingham, temporary secretary.

The sentiment of the meeting was in favor of a medical center and the chairman was authorized to appoint a committee which will make further study of the questions discussed and present plans for a permanent organization.

This movement has been inaugurated at this particular time because of the evident necessity of important changes which must be undertaken by the Medical Library.

Since it is recognized that the Library cannot properly function in the space at present available and since it is an important factor in medical affairs in this part of the country all professional bodies interested in or dependent on the Library may very properly be encouraged to aid in any plan for its expansion.

MISCELLANY

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

DISEASES REPORTED FOR THE WEEK ENDING NOVEMBER 29, 1924

Diseases	No. of Cases	Diseases	No. of Cases
Anterior poliomyelitis	2	Ophthalmia neonatorum	10
Chickenpox	281	Pneumonia, lobar	119
Diphtheria	125	Scarlet fever	261
Dog-bite requiring anti-rabic treatment	3	Septic sore throat	2
Encephalitis lethargica	3	Syphilis	27
Epidemic cerebrospinal meningitis	3	Suppurative conjunctivitis	17
German measles	16	Trachoma	2
Gonorrhea	75	Tuberculosis, pulmonary	95
Influenza	17	Tuberculosis, other forms	16
Measles	120	Typhoid	14
Mumps	109	Whooping cough	74

MAINE STATE DEPARTMENT OF HEALTH

INFECTIOUS DISEASES REPORTED FOR THE WEEK ENDING NOVEMBER 22, 1924

<i>Chickenpox</i>	East Millinocket	1
Auburn	8 Fryeburg	1
Augusta	2 Lewiston	1
Bangor	4 Oxford	2
Brunswick	4 Portland	2
Dover-Foxcroft	1 Sanford	1
Fairfield	1 South Portland	1
Gardiner	14 Robbinston	1
Lewiston	2	—
Mexico	1	12
Norway	1	—
Portland	33	—
Richmond	3 Bangor	1
Sanford	3 Farmington	1
South Portland	3 Lebanon	1
Waterville	4 Northfield	1
Westbrook	2	—
Winslow	1	4
	<i>Scarlet Fever</i>	87
	Auburn	2
	Brewer	1
	Bingham	2
Auburn	1 Calais	1
Bryant's Pond	1 Damariscotta	2
Gardiner	6 Dover-Foxcroft	2
Lewiston	1 Fairfield	1
Livermore	25 Friendship	2
Mexico	6 Lewiston	1
Portland	2 Milo	5
Waterville	9 Prentiss	1
Westbrook	2 Richmond	3
Winslow	— Sebec	1
	55 Westbrook	4
	<i>Gonorrhea</i>	28
Auburn	1	—
Harrington	1	—
Houlton	1 Cushing	1
Madrid	1 Cape Porpoise	1
Rockland	1 Emden	1
Warren	1 Kennebunk	1
	1 Kingsbury Pl.	1
	6 Linneus	1
	Portland	2
	Solon	1
	<i>Influenza</i>	9
Brunswick	1	—
East Millinocket	7	—
Portland	1	—
	<i>Tuberculosis</i>	9
	Auburn	2
	Bangor	3
	Eastport	1
	Lewiston	1
	Portland	1
	Solon	1
	<i>Measles</i>	7
Auburn	1	—
Bridgewater	1	—
Calais	1	—
Ellsworth	7	—
	<i>Typhoid Fever</i>	10
	Augusta	1
Bangor	16 Bangor	1
Bath	1 Farmington	1
Brunswick	4 Madison	1
Bryant's Pond	15 Portland	2
Caribou	2 Sebec	1
Dixfield	2	—
Dover-Foxcroft	2	7
Portland	21	—
South Portland	9	—
Waterville	3	—
	<i>Vincent's Angina</i>	3
	Portland	2
	<i>Whooping Cough</i>	75
	Bridgewater	8
	Lewiston	17
	<i>Pneumonia</i>	25
Canaan	1	—
Dayton	1	—

RHODE ISLAND STATE BOARD OF HEALTH

CONTAGIOUS DISEASES REPORTED FOR THE WEEK ENDING NOVEMBER 15, 1924

<i>Diphtheria</i>		<i>Scarlet Fever</i>	
Cranston	2	Pawtucket	5
Newport	1	Providence	10
Providence	6	Woonsocket	4
Pawtucket	3	Bristol	1
		Coventry	2
<i>Typhoid Fever</i>		East Providence	1
Providence	1		
Woonsocket	1	<i>Smallpox</i>	
<i>Chickenpox</i>		Bristol	1
Pawtucket	1		
Providence	2	<i>Whooping Cough</i>	
Hopkinton	10	Providence	3
<i>Ophthalmia Neonatorum</i>		<i>Measles</i>	
East Providence	1	Providence	3

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

DISEASES REPORTED FOR THE WEEK ENDING NOVEMBER 22, 1924

Diseases	No. of Cases	Diseases	No. of Cases
Anterior poliomyelitis	5	Ophthalmia neonato-	—
Chickenpox	242	rum	18
Diphtheria	168	Pneumonia, lobar	105
Dog-bite requiring	—	Scarlet fever	219
anti-rabic treat-	—	Septic sore throat	1
ment	5	Syphilis	61
Encephalitis lethar-	—	Tetanus	2
gica	1	Suppurative conjunc-	—
Epidemic cerebrospi-	—	tivitis	32
nal meningitis	1	Tuberculosis, pulmo-	—
German measles	4	nary	105
Gonorrhea	131	Tuberculosis, other	—
Influenza	7	forms	22
Measles	96	Typhoid	11
Mumps	56	Whooping cough	68

MEETING OF THE BOSTON ASSOCIATION FOR THE PREVENTION OF HEART DISEASE

THE Boston association for the prevention and relief of heart disease met on Thursday evening, November 20th, in the amphitheatre of the Peter Bent Brigham Hospital. Dr. Jackson, president of the association, presided. Dr. Edwin H. Place addressed the meeting on "The Heart in Acute Affections."

He pointed out that there are only two contagious diseases in which cardiac damage occurs frequently enough to be of importance, namely scarlet fever and diphtheria. He described the symptoms which accompany the onset of heart trouble after diphtheria. The most frequent of these are pallor, lassitude and irritability. If damage to the heart is more marked, vomiting occurs. Changes in the heart sounds are not very noticeable. Frequently there is abdominal pain resembling acute cholecystitis. Disturbance of the rhythm is also fairly common. The suddenness with which the symptoms appear at the onset and again disappear on recovery are very characteristic. If the patient does not succumb dur-

ing the first week he is likely to recover. Heart block is also characteristic of this disease but more rare and of more serious prognosis than the other symptoms. In most cases of this disease recovery is complete, at least as far as the clinical picture is concerned. However, the heart will show definite degenerative changes histologically even though it is not evident clinically. The efficiency of the heart is not impaired, as a rule, after this disease. Dr. Place said he could recommend no drug for this condition. Digitalis does no good and is often contra-indicated. The important thing is to keep the demand on the cardiac effort at a minimum and to keep the patient on almost starvation diet. No food is given by mouth on account of the tendency to vomit and the fact that the normal peristalsis ceases during the acute period of the disease. Endocarditis or pericarditis may occur as well as typical toxic damage to the heart, but there is nothing very distinctive about these complications and they are rather rare.

The endocarditis or pericarditis accompanying scarlet fever is very similar to that in rheumatic fever. From 1 to 3% of scarlet fever patients develop one or other of these conditions. Nearly half of the scarlet fever cases that develop the characteristic arthritis also have endocarditis. Evidence of bacterial infection either in the joint or heart is seldom found although a few years ago multiple septic joints in scarlet fever were fairly common. Of late years scarlet fever is becoming a milder disease. Its seriousness has dropped off more rapidly than that of tuberculosis. Dr. Place emphasized the extreme importance of a long rest after heart damage especially in cases of endocarditis.

A discussion followed Dr. Place's address in which Dr. White, Dr. Robey and Dr. Levine participated. Dr. White mentioned the possibility of a relationship between congenital heart disease and cases of heart block in diphtheria. Dr. Robey suggested the possibility that early fibrosis resulting from damage by these diseases in early life might be the cause of cardiac insufficiency in middle life. Dr. Levine raised the question as to whether early diphtheria could have any connection with heart block quite a number of years later in life. Dr. Place in reply said he doubted if there is any relationship between them. It is important to distinguish between heart block and brachycardia, the latter being due to increased vagal tone. The electrocardiogram makes the distinction.

MEETING OF THE HARVARD MEDICAL SOCIETY

HARVARD MEDICAL SOCIETY held its regular meeting on Tuesday evening, November 25th, at the Peter Bent Brigham Hospital. Two cases were demonstrated; one, a surgical case of a child with a blood vessel tumor of the brain, the

other a medical case of a man with infarction of the heart from coronary occlusion. The symptoms of these cases were outlined with special features in the diagnosis.

Dr. W. L. Aycock of the Department of Preventive Medicine addressed the meeting on the "Epidemiology of Infantile Paralysis." He spoke of the early records of the disease dating as far back as 1790. The first epidemics were reported between 1850 and 1860. Previous to 1884 the disease had been considered spontaneous atrophy of the anterior horns of the spinal cord.

About 1906 and 1907 the disease began its present wave in this country but little in the nature of statistics was available previous to 1910. From the data collected in the registration area in the United States since that time it would appear that there are two possible cycles of the disease, one of six years' and the other of four years' duration. By this he meant that there is an increase in the number of cases reported every sixth or every fourth year but he is not convinced that either is a true cycle since statistics have been gathered only for a few years. The disease has been practically stationary in Massachusetts for the last four years. Whenever the number of cases in this state has fallen below two hundred per year there has been an outbreak the following year. This low level has not been reached since 1920.

The most interesting feature with regard to the epidemiology of the disease is its seasonal prevalence. The etiological factor seems to be favored by certain seasonal conditions. As a rule the largest number of cases occur in September although, in the great epidemic of 1916, the maximum was reached in August. Each year there is a suggestion of a secondary increase in the spring. A very noticeable difference between northern and southern states is the relatively high spring maximum and the relatively low summer maximum of the south as compared with those of the north.

Another unusual feature shown by the statistics is the high mortality rate when the morbidity is low and the low mortality rate when the morbidity is high. In September the mortality is about 20% for the whole registration area whereas in January it reaches 60%. Dr. Aycock suggested an explanation of this in the probability that the disease is more easily recognized in the summer. In the winter other conditions may be confused with it. There seems to be a seasonal shift in the diagnosis of similar diseases.

The attempt to show some causal relation between cases in the same vicinity brings out some puzzling facts. Where multiple cases break out in the same family they usually occur within two or three days of each other. It does not seem likely that one arises from another in such an instance but rather that they both have re-

ceived the virus from a common source. This seems probable because as nearly as can be determined the period of incubation is about seven days. True secondary cases in the same family are rather rare. When one does occur it is a very definite interval, usually two or three weeks after the outbreak of the first case. Dr. Aycock, in his studies of the occurrence of the disease in Vermont, found that the same principle applied to communities. Families within a few miles of each other have had cases at almost the same time. In other instances such cases would be separated by a definite period. This might readily be taken as the period of incubation except that for the fact in many instances members of the families in question were not acquainted and did not associate in any way.

In speaking of the theories of the cause of the nerve cell injury and degeneration in this disease Dr. Aycock gave several reasons for the opinion that the destruction of the nerves resulted from a lack of nutrition rather than from the direct action of the virus. This deficiency of nutrition might easily be caused by obstruction of the delicate capillaries in the perivascular spaces supplying the nerve tissue of the anterior horns. This theory of vascular obstruction is supported by the fact that the cells involved present the appearance of nerve cells undergoing degeneration due to pressure.

Several members of the Harvard Infantile Paralysis Commission participated in the discussion following Dr. Aycock's paper. Dr. Osgood spoke of the disease in monkeys in relation to the mode of transmission. Very little is known about this but there is cumulative evidence against the possibility of spread by personal contact. Dr. Peabody suggested the possibility that the disease often occurred in a mild form, the recognition of which might throw some light on the subject. Dr. Ober outlined the treatment of the disease and also expressed his disapproval of the use of massage in treatment since it is apparently of no benefit and in many cases does harm by greatly prolonging the tenderness of the muscles.

AN EXPERIMENTAL MEDICAL SERVICE

CO-OPERATION with the Harvard Mercantile Health Work, the American Trust Company at 50 State Street has just completed one year of an experimental medical service for its officers and employees. The results obtained so far are declared by officials of the bank to be highly satisfactory, and the service is now considered a permanent department of the bank.

A physician keeps regular office hours and is available for consultation by all employees without charge. Except in emergencies, the doctor does not give treatment. Many of the officers and employees have formed the habit of taking

an annual physical examination and every new employee is urged, but not required, to be examined after entering the employ of the Trust Company. The service is voluntary, not compulsory.

The doctor has conducted an educational campaign against colds with particular emphasis on preventing their spread. Officials of the bank realize the service has been in effect too short a time to have had a very decided effect on absenteeism from illness, but it is believed that the standard of health has been raised as a result of the service and that it is a distinct benefit both to the employees and the bank.

ADDRESS AT HARVARD SCHOOL OF PUBLIC HEALTH

ON Thursday, November 20th, Dr. Chas. P. Chapin of Providence, R. I., addressed the students of Public Health on "Practical Vital Statistics." He explained the working of the "Model Law" for registration of births and deaths, emphasizing the importance of accuracy if the statistics were to be of real value.

Most of the states in the Union now have an adequate law. It remains to perfect its operation. Dr. Chapin spoke of the steps which had been taken in this direction in Providence.

\$190,000 FOR HOSPITAL

New York, Nov. 26.—Gifts totalling \$190,000 have been made to the building fund of a Presbyterian hospital in memory of the late William Sloane and his father, John Sloane, by members of the family and relatives. The money will be devoted chiefly to the completion of specific units of the new building to be erected at Broadway and 165th Street in conjunction with the Columbia University School of Medicine.

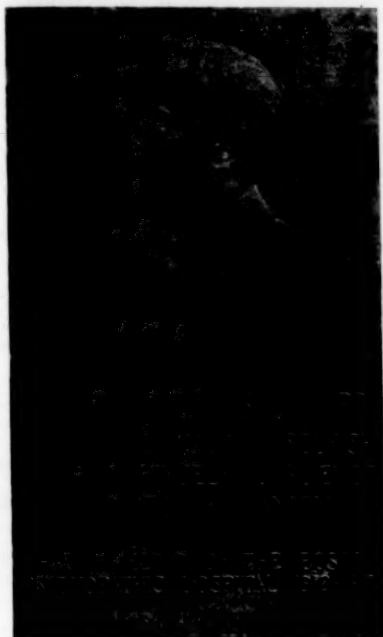
John Sloane was president of W. & J. Sloane and was a member of the board of managers of the hospital from 1883 until his death in 1905. William Sloane became a member of the board in 1901 and was president from 1916 until his death in 1922.—*Transcript, Nov. 26.*

UNIVERSITY AND EDUCATIONAL NOTES

THE University of Chicago has set aside a tract of nine acres, the two blocks west of Ellis Avenue facing the midway, to be devoted wholly to the new medical school. The buildings now on this tract will be removed in time, and the university will immediately spend \$4,000,000 for hospitals, laboratories and teaching quarters, and eventually not less than \$3,000,000 more. To endow the work to be housed in these buildings will call for \$5,000,000 in the near future.—*Science.*

DR. ELMER ERNEST SOUTHARD

On November 18th the memorial to Dr. Southard was unveiled at the Psychopathic Hospital. It is a large bronze portrait bas-relief, a notable portrait as well as a work of art, done by the sculptress, Baschka Paeff. It is in the main entrance hall.



The unveiling was attended by a considerable group of Dr. Southard's friends, co-workers and students. The exercises were simple but impressive. The unveiling was by Dr. Southard's daughter, Anne.

Dr. William Healy spoke shortly of Southard the versatile contributor to Science and the planner, of the Psychopathic Hospital. Dr. Harvey Cushing spoke of Southard the man who refuses to let himself be forgotten, and Dr. Macfie Campbell talked of Southard as an indefatigable worker who passed on the torch of knowledge.

All those interested were invited to call and see the memorial.

THE EYE SIGHT CONSERVATION COUNCIL OF AMERICA

DEFECTIVE eyesight in the public schools is costing the tax-payers of the nation at least

\$130,000,000 annually, it is asserted by the Eye Sight Conservation Council of America, which, in a statement sent to directors of summer schools throughout the country, urges organized conservation of vision as a social and economic need.

The Council points out that poor eyesight is responsible for much of the retardation in schools, and makes public the results of investigations showing that a large proportion of backward children have visual defects.

Accompanying the statement is a report revealing that heavy moral and financial losses arise from this evil. Approximately 25 per cent of all school children in the United States, the Council finds, are retarded in their studies and fully one-third of this retardation is conservatively estimated as due to defective vision.

If this is a correct estimate, there are at least 2,000,000 school children in the United States one or more years behind in their studies because of defective vision, says the Council's report, continuing:

"According to the United States Bureau of Education the cost of public elementary and secondary education for the entire United States averaged, in 1920, \$64.16 per pupil per year. If each one of the 6,000,000 retarded children in the United States, as estimated, was forced to drop back only one year, the cost would be \$390,000,000.

SAVING NEW YORK BABIES

TEN thousand babies' lives were saved in the city of New York in 1923, with an infant mortality rate of 66 per thousand reported births, according to the Weekly Bulletin of the New York Health Department. This places the city at the head of the list of the ten largest cities in the birth registration area of the United States.

The efforts at improving child health were not only successful in baby welfare work, but also in the care of pre-school age children and with the children in school. Contagion has been successfully prevented from spreading in the schools. Thus during the year reported only 322 cases of measles, 8 of diphtheria, 90 of scarlet fever, 881 of chicken pox and 137 of whooping cough had to be excluded.

Thousands of children were examined in the refraction clinics, and thousands were taught the use of the tooth brush and received dental care in the dental clinics. Moreover, midwives, it is claimed, are now under such excellent control that no cases of sepsis and only two of ophthalmia were reported during the year. It was, however, not until 1922 that the Sanitary Code of New York required physicians as well as midwives to instill silver solution into the eyes of the newborn.

NEWS ITEMS

THE SPRINGFIELD ACADEMY OF
MEDICINE

THE regular meeting of the Academy was held Tuesday evening, December 9th, at 8.30.

Dr. Allan O. Whipple, Professor of Surgery at the College of Physicians and Surgeons, New York City, read the paper of the evening entitled, "Sub-Diaphragmatic Abscess," illustrated with lantern slides.

Discussion was opened by Dr. F. B. Sweet. General discussion followed.

Dr. Louis Gregory Cole's moving pictures of the stomach and duodenum were also shown.

HARVARD MEDICAL SOCIETY

A MEETING was held in the Peter Bent Brigham Hospital Amphitheatre Dec. 9, 1924.

PROGRAM

1. Demonstration of cases.
2. Hematoma of the Dura Mater and its Relation to the Pachymeningitis Hemorrhagica Interna—Dr. Tracy J. Putnam.
3. The Discovery of the Valves in the Veins—Dr. Edward C. Streeter.

NORFOLK SOUTH DISTRICT MEDICAL
SOCIETY

A MEETING for Medical Improvement was held at the Norfolk County Hospital, South Braintree, Thursday, December 4, 1924, 12:00 noon. Speaker: Doctor Warren R. Sisson. Subject, "Modern Methods of Infant Feeding."

THE EDISON ELECTRIC ILLUMINATING CO. is giving a course of instruction on the methods of resuscitation to a class of its women employees.

DIPLOMAS were given to ten nurses at the first graduating exercises of the training school for nursing attendants in the New England Peabody House for Crippled Children, Dec. 2.

THE STATE COMMISSION IN ADMINISTRATION AND FINANCE is seeking authority to sell the Norfolk State Hospital.

LECTURES AT THE HARVARD SCHOOL OF PUBLIC HEALTH—Dr. W. F. Rankin, Secretary of the North Carolina State Board of Health, has given two lectures at the Harvard School of Public Health, December 4 and 9.

He has discussed the Value of Standards in Municipal Health Work and described the Methods of Evaluating Efficiency of County Health Work in North Carolina.

BOSTON CITY HOSPITAL—A staff clinical meeting was held in the Cheever Surgical Am-

phitheatre of the Boston City Hospital Friday, Dec. 5, 1924, at 8.15 P. M.: Fungus Infections of Skin, J. G. Downing; Congelation Dermatitis, T. W. Thorndike; Gumma of Scalp with Perforation through Parietal Bone, W. T. Garfield; Treatment of Tinea Trichophytosin by Kromayer Lamp, M. C. VonGroll; Treatment of Syphilis with Bismuth, W. P. Boardman; Syphilitic Bursitis, B. Appel. Open discussion followed.

REMOVALS

DR. ALEXANDER McROBBIE of Lynn has moved to 333 Union St.

DR. CHARLES A. WILLIAMS has moved from Brookline to Needham where he is at 304 Nehoiden St.

DR. JULIA T. METCALF's address in Los Angeles, Cal., is now 101 South Oxford St.

DR. JAMES F. COUPAL's address in Washington is now at the White House.

DR. JOSEPH C. AUR now has his office at the Mass. General Hospital, Boston.

DR. ANDREW T. BARSTOW has moved from Beacon St. to 536 Commonwealth Ave., Boston.

DR. EVERETT FLOOD is now at 819a Congress St., Portland, Me.

DR. GEORGE L. GABLER of Holyoke has moved from Appleton St. to 98 Suffolk St.

DR. LESLIE H. WRIGHT has moved from Palmer (Hampden) to the Peter B. Brigham Hospital, Roxbury (Norfolk).

DR. E. H. MACMICHAEL is now at Englewood, Florida.

DR. M. J. HALLORAN has moved from Worcester to Jacksonville, Florida, where his address is Hotel Burbridge.

DR. WINTHROP ADAMS has moved from Cambridge to Washington, D. C., where his address is 1703 N. Y. Ave.

DR. FLORENCE E. H. KNOWLTON has returned to the State Public School at Sparta, Wis., from Worcester.

DR. OSCAR S. CREELEY has moved from 63 to 128 Mt. Auburn St., Watertown.

DR. BELLE J. ALLEN's present address is Calcutta, India, India Industrial Mission.

DR. AUBREY J. POTHIER of New Bedford has moved from Purchase St. to 344 Summer St.

DR. CHARLES W. TOWNSEND is traveling in the West. Letters addressed to Ipswich, Mass., will be forwarded to him.

DR. ALTON J. CHOATE has moved from Tennessee to Dayton, Ohio, where he is at the National Military Home.

DR. DAVID E. MANN has moved from Norfolk to Needham, 921 Great Plain Ave.

DR. LAURENCE A. BETTERIDGE has moved from Suffolk to the Non-Resident List and is situated in Millbridge, Me.

DR. MASON R. PRATT has been transferred from Fall River (Bristol South) to Swampscott (Essex South) where he has an office at 84 Humphrey St.

DR. FRANK S. CRICKSHANK has moved from Dorchester to Brookline. His office is, as before, 520 Beacon St., Boston.

DR. FLOYD R. SMITH of Pittsfield now has his office at 150 North St.

OBITUARY

THEODORE HOUGH, M. D.

THEODORE HOUGH, Dean of the Medical Department of the University of Virginia, was not a physician nor had he been for nearly twenty years a resident of Massachusetts. So important, however, was his position in the medical profession and so happy had been his associations in Boston in his earlier years that his death will be keenly felt by his many friends here.

Born in Front Royal, Virginia, in 1865, the son of Rev. Robert R. T. and Virginia Baer Hough, he received his A. B. from Johns Hopkins in 1886 and his Ph. D. in 1893. He then took up his work at the Massachusetts Institute of Technology as Instructor, and later, Assistant Professor of Biology. This brought him into intricate relations with the late Prof. Wm. T. Sedgwick.

In 1903, he became Professor of Biology in the then new Simmons College. He was also Instructor in Physiology and Hygiene in the Boston Normal School of Gymnastics.

In 1907, he was called to the Chair of Physiology in the University of Virginia. For the past eight years he served as Dean of the School.

One of the most important of his accomplishments was the decision to retain the Medical School in Charlottesville in close association with the wonderfully beautiful University founded by Thomas Jefferson.

This decision was due in great part to the

influence of the Dean who felt that the atmosphere of the University town more than counter balanced the larger clinical facilities of Richmond. It meant the building up of the hospital facilities and the creation of a medical centre in Charlottesville, a work carried out with signal success under Dr. Hough's leadership.

His prominence in the American Academy of Arts and Sciences, in the American Physiological Society and other national societies, as well as the Presidency in 1922 of the Association of American Medical Colleges, shows the esteem in which he was held by his colleagues.

His widow, who was Miss Ella Grey Whitehead of Richmond, and two sisters survive him.

His loss will be keenly felt, not only in Virginia, but in Massachusetts where his ability, character and broad vision were recognized. The medical profession has lost a tried and able leader.

RECENT DEATH

DR. RUSSELL BRADFORD SPRAGUE died at the Cape Cod Hospital, Hyannis, December 21, 1924, after a lingering illness, at the age of thirty-seven.

Dr. Sprague was a graduate of Tufts College Medical School in 1910, specialized in Public Health, entered the Massachusetts Medical Society from Boston in 1912 and had lived several years in Barnstable with an office in Yarmouthport. He was a member of the American Medical Association.

NOTICES

THE HARVARD MEDICAL SOCIETY

THE next regular meeting of the Harvard Medical Society will be held as usual in the amphitheatre of the Peter Bent Brigham Hospital, December 9, at 8:15 P. M. The program follows:

1. Demonstration of cases.
2. Hematoma of the Dura Mater and its Relation to Pachymeningitis Hemorrhagica Interna, Dr. Tracy J. Putnam.
3. The Discovery of the Valves in the Veins, Dr. Edward C. Streeter.

All members of the medical profession, medical students and nurses are invited.

HARVARD PUBLIC HEALTH CLUB

THERE will be a social meeting of the Harvard Public Health Club on Thursday, December 11, 1924, at eight o'clock, in the Harvard School of Public Health, 55 Van Dyke Street, Boston.

Dr. Eugene R. Kelley of the Massachusetts

State Board of Health will speak at the Harvard School of Public Health on December 11, 1924, at 3 o'clock. His subject will be "Personalities, politics, public opinion and the health administrator."

Professor Eugene Wambaugh of Harvard Law School will lecture on Public Health Law on December 16 and December 18 at 3 o'clock in the Harvard School of Public Health.

BOSTON MEDICAL HISTORY CLUB

The Boston Medical History Club will hold a meeting at the Boston Medical Library on Monday, December 15, 1924, at 8:15. Program: "Remarks on Thomas Sydenham, Our Model Practical Physician," by Dr. Reginald Fitz.

INDUSTRIAL TOXICOLOGY

DR. ALICE HAMILTON has just returned from Russia to take up her work in Industrial Toxicology in the Harvard School of Public Health. Last year various members of the Massachusetts State Department of Health and of the Health Department of the City of Boston attended lectures delivered by Dr. Hamilton and found them very interesting and instructive.

The lectures will come on Monday, Wednesday and Friday afternoons at 3:15 and will be given in the School of Public Health building. The fee for the whole course, which lasts two months, December and January, will be \$50.00.

BOSTON MEDICAL HISTORY CLUB

BOSTON MEDICAL LIBRARY, Monday, December 15, 1924, at 8.15 P. M.

PROGRAM

1. Remarks on Thomas Sydenham, our model practical physician. By Dr. Reginald Fitz.
2. Notes on the published works of Sydenham. By James F. Ballard.

This is the 300th anniversary of the birth of Thomas Sydenham. Members having pictures, books, and other matter related to Sydenham are requested to bring them to the meeting for exhibition.

H. R. VIETS, M. D., *Secretary.*

NEW ENGLAND ROENTGEN RAY SOCIETY

THE next meeting will be held December 19 at 8 o'clock at the Boston Medical Library.

Subject: Exposition of Dr. L. G. Cole's moving pictures of the stomach and duodenum. The discussion will be opened by Dr. William E. Preble, followed by Dr. Frank H. Lahey, Dr. H. H. Germaine, Dr. F. W. White and Dr. C. W. McClure.

An invitation is extended to the profession to attend this meeting.

FRANK E. WHEATLEY,
Secretary.

A PHYSIOLOGICAL CONFERENCE will be held Wednesday, December 17, in the Bowditch Library, Building C, Harvard Medical School, at 4 P. M. Dr. W. B. Cannon will speak on "A Pseudoaffective Preparation and Some Phenomena Which It Manifests."

SOCIETY MEETINGS

Essex North District Medical Society

January 7, 1925. Semi-annual meeting at Haverhill.
May 6, 1925. Annual meeting at Lawrence.

Franklin District Medical Society

The meetings of the Franklin District Medical Society will be held on the second Tuesday of January, March and May.

Hampden District Medical Society

Meetings to be held on the third Tuesday of January and the third Tuesday in April.

Hampshire District Medical Society

The meetings will be held the second Wednesday of November, January, March and May.

Middlesex East District Medical Society

Wednesday, January 21. Harvard Club. Dr. Franklin K. White, "Diagnosis of Gall-Bladder Disease."
Wednesday, March 18. Harvard Club. Dr. John H. Cunningham, "Urinary Retention: Its Significance and Treatment."
Wednesday, April 16. Harvard Club.
Wednesday, May 13. Colonial Inn, North Reading.

Middlesex North District Medical Society

January 28, 1925.
April 29, 1925.

Middlesex South District Medical Society

Winter Schedule—The plans for winter meetings of the Society include the stated meetings in October and April, two hospital meetings, and five meetings to be held in conjunction with the Suffolk District Medical Society and the Boston Medical Library (two surgical, two medical, and one general).

Norfolk District Medical Society

January 27, 1925. Masonic Temple. Subject: "Some Trends of Medical Teaching and Medical Practice." Speakers: Dr. A. S. Begg and W. P. Bowers.
February 24, 1925. Masonic Temple. Subject: "The Need of Periodical Physical Examinations and How to Make Them." Speaker: Dr. Francis H. McCrudden. A second speaker will be selected to present another subject at this meeting.
March 31, 1925. Tufts College Medical School. This meeting given over to Drs. Leary and Watters for the purpose of giving us a medical examiners' talk.

Norfolk South District Medical Society

Meetings will be held the first Thursday of each month from October to May, inclusive, at 12 noon, at the Norfolk County Hospital, South Braintree.

Suffolk District Medical Society

December 17. Medical Section, in association with the Middlesex South District Medical Society. "The Newer Drug Treatment of Heart Disease." Dr. Paul D. White.
January 24. General meeting, in association with the Boston Medical Library and the Middlesex South District Medical Society. "Some Experiences of a Medico-legal Pathologist" (Lantern slides). Dr. George B. Magrath.
February 25. Surgical Section, in association with the Middlesex South District Medical Society. "Pyelonephritis." Dr. Arthur H. Crooble.

March 25. Medical Section, in association with the Middlesex South District Medical Society. "The Treatment of Pneumonia." Dr. Edwin A. Locke.
April 29. Annual meeting. "Hypertension and Longevity." Dr. Harold M. Frost.

Worcester District Medical Society

January 7, 1925. Surgical meeting. Place, subject and speaker to be announced.
February 11, 1925. Memorial Hospital, Worcester. Papers will be read by the members of the hospital staff.
March 11, 1925. St. Vincent's Hospital, Worcester. Papers will be read by the members of the hospital staff.
April 9, 1925. Subject and speaker to be announced.
May 14, 1925. Annual meeting.